THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. VIII. No. 183—11th YEAR.] LONDON, OCTOBER 25, 1859. [Subscription per Ann. { 15s. in Advance / 18s Credit. ] DOUBLE No. Price 1s.

TO GAS COMPANIES.

**FIRE-CLAY Retorts and Fire Goods.**

The Advertiser has brought his Fire-Clay Retorts to great perfection, both as to quality and finish. Many have stood three and four years.

Every description of Fire Goods in any quantity always on hand. The Fire Clay is the very best in the North of England. Stock never less than 10,000 tons weathering.

Orders promptly executed.

Apply, G. H. RAMSAY, of Derwenthaugh Fire-Brick Works, near NEWCASTLE-ON-TYNE.

Aug. 23, 1856.

**CLEGG ON COAL GAS.**

Just Published, price £1. 11s. 6d., the Third Edition, greatly enlarged, with numerous additional Illustrations, of

**A PRACTICAL TREATISE on the** MANUFACTURE and DISTRIBUTION of COAL GAS, its Introduction and Progressive Improvement. By SAMUEL CLEGG, Jun., M. Inst. C. E.

London: JOHN WEALE, HIGH HOLBORN.

**CAUTION.**

TO GAS-METER MANUFACTURERS AND OTHERS.

**THE Undersigned hereby caution** Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against.

CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

**WANTED permanently, a Foreman** in a small Work, practically competent in Gas Making, Fitting and Repairing Meters. Wages 21s. Rooms, Gas, and Fuel.

Address A., care of Mr. BARNES, 154, Upper Street, ISLINGTON.

COWEN'S PATENT FIRE-CLAY RETORTS.

**JOSEPH COWEN and CO.,**
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

**JOHN RUSSELL AND CO.,**
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

FIRE BRICKS.

**THE MACHEN COLLIERY** COMPANY, NEWPORT (MON.).

Shippers of Fire-Goods of First-class quality manufactured from a remarkably pure seam of Fire-Clay.

Railway Communication by Broad or Narrow Gauge with all parts of the Kingdom, and by Seaboard, Coastwise, and Foreign.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

**WILLIAM COCHRAN CARR begs** most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

**THE UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY** having been disappointed, in consequence of a person tendering in reply to their former advertisement, and whose Tender was accepted, not being able to find the necessary amount of money to take the Works, are again open to receive applications to take the said Works on Lease.

Full particulars may be obtained, and a Draft of the proposed Contract inspected, on application to the Secretary, Mr. W. GARDINER, UXBRIDGE; or to Mr. ALFRED PENNY, Engineer, Wharf Road, City Road, LONDON. Tenders to be sent to Mr. W. GARDINER, Solicitor, UXBRIDGE, on or before the 10th of November.

The Company do not bind themselves to accept the lowest or any Tender.

TO DIRECTORS OF GAS COMPANIES.

**THE Advertiser is in want of a Situation** as FOREMAN or METER INSPECTOR, or do the whole repairs of Gas-Fittings, Services, and Public Lamps, and light repairs of Meters. A seven years' character will be given from his last employers.

Apply to D. C., Caledonia Terrace, Cook's Grounds, King's Road, CHELSEA.

**JOHN ROGERSON and CO.,** NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

**LORD REDESDALE'S ACT.**

GAS-METERS.

**D. HULETT & CO.**

Have made their Meters with the Low Spouts; consequently no alteration is required.

55 and 56, HIGH HOLBORN, LONDON.

**LORD REDESDALE'S SALE OF GAS ACT.**

**WET AND DRY GAS-METER WORKS,**

GREAT PETER STREET, WESTMINSTER.

**THOMAS EDGE has the satisfaction to inform those Directors of Gas Companies who have favoured him with their Orders for his Patent Improved Wet Meters—of which he has sent out upwards of 80,000—that they will not require any alteration under the provisions of the Sale of Gas Bill; whereas the Common Meters in use in the United Kingdom which have been proved so susceptible of error in their measurement are required to be taken down and altered at considerable expense.**

**Thomas Edge begs to state that he is prepared to supply his Patent Meters, which meet the requirements of the Act, to any Company at the present time; and, so soon as arrangements are made in London to have Meters tested and stamped, he will then supply them to Country Gas Companies with the Legal Stamp affixed, ready for use.**

JOURNAL OF GAS LIGHTING NEWSPAPER PENNY

MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

# THOMAS GLOVER,

## PATENT DRY GAS-METER MANUFACTURER,

SUFFOLK STREET, CLERKENWELL GREEN, AND
ALLEN STREET, GOSWELL STREET, E.C.

*Established* 1844.

## LORD REDESDALE'S "SALE OF GAS BILL."

*LONDON, August* 15, 1859.

THOMAS GLOVER takes the earliest opportunity of intimating to Gas Companies and his other Customers that, as Lord Redesdale's "Sale of Gas Bill" has determined the unit of measurement, he is now prepared to supply his Patent Dry Gas-Meters guaranteed to meet all the legal requirements of that bill.

THOMAS GLOVER confines his sole attention to the business of Gas-Meter Making. The propriety of his doing so is satisfactorily proved by his success; and, without the practice of any quackery, or any attempt to delude the public by an absurd exhibition of "Old and New Valves," his Meters are in general use by the Metropolitan Gas and other Companies in this Country and abroad. For example, one Metropolitan Company have now in use above **12,500** of his Patent Dry Gas-Meters; some of these Meters have been fixed for Fourteen Years, and are still in working order, without complaint from either the Company or the Consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other Country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may at any time inspect his Works and the Materials of which his Meters are constructed. He is ready to enter into Contracts with Gas Companies and others to uphold their Stock of his Meters for Twenty Years at an annual charge varying from 2½ to 5 per cent., and to leave always in the hands of Gas Companies Three Years' charge for upholding, as a guarantee for the fulfilment of the Contract.

CROSLEY & GOLDSMITH'S

## PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

**CANNOT BE OVER OR UNDERCHARGED WITH WATER,**

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

## CROSLEY & CO.,

GAS-METER MANUFACTURERS,

## 103, SOUTHWARK BRIDGE ROAD, LONDON.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

**C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.**

## CONTENTS.


*Leading Articles:*— PAGE

Notes upon Passing Events .. 563
Stephenson and Brunel .. 565
Superannuation and Sick Funds .. 566

*Circular to Gas Companies* .. 567

*Communicated Articles:*—

On the Variable Composition of Thames Water .. 569
Trials with the Patent American Burner .. 571

*Correspondence:*—

Compensating Gas-Meters .. 571
The Metropolitan Gas Supply .. 572
Leakage and Fuel Accounts .. 574
Open-Ended Retorts .. 574
Fever in Holland .. 574

*Register of New Patents:*—

Chantrell and Dutch's Improvements in Apparatus for Flushing Water-Closets, &c. .. 575
Mennons' Improved Articulated Joint .. 575
Brown's Improvements in Stoves .. 575
Aitchison's Improvements in Taps .. 575
Moule's Compound Liquid for Illuminating Purposes .. 575
Prosser's Improvements in Apparatus employed in the Production of Light .. 575
Porter's Improvements in Valves and Cocks .. 575
Provisional Protections .. 576
Notices of Intention to Proceed .. 576
Patents which have become Void .. 576

*Legal Intelligence:*—

Court of Bankruptcy.—Re E. and A. Prior .. 576
Thames Police Court.—Nuisances on Bow Common .. 576
Inquiry into the Origin of the Fire on the Premises of the Paraffin Light Company .. 577

*Miscellaneous News:*—

The Lighting of Oldham .. 587
Meeting of the London Gas Company .. 579
Meeting of the Imperial Gas Company .. 581
The Metropolitan Gas Supply—
Meeting of the Delegates .. 582
Westminster District Board of Works .. 583
Superannuation and Sick Funds .. 585
Gas in Germany .. 586
Conviction for Wasting Water .. 586

*Price Current* .. 586


## TO CORRESPONDENTS.

One of the Victimized.—*If you have no intention of complying with the invitation delicately conveyed by the red-ink address, you ought to return the paper to the postman. Waste paper even may be purchased at too dear a rate, and we were ourselves mulct of 50 pence monthly till we remonstrated;* hinc illæ lachrymæ.

T. K., Peeltown.—*It is impossible to answer such questions without personally examining the retorts. All clay retorts require to be scurfed periodically, and, from your account, we should not be inclined to attach any blame to the foreman.*

W. M., Leighton Buzzard.—*We apprehend Mr. Keane's decision in the Sudbury case will be reversed by the Court of Queen's Bench.*

## NOTICES.


The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, Nov. 8, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This Journal has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.



# THE JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, OCTOBER 25, 1859.*


## NOTES UPON PASSING EVENTS.

Without presenting any very marked or characteristic events, the last fortnight has, nevertheless, been fruitful in lessons for those who are disposed to look a little below the surface. For instance, within that short period the utter discomfiture of the United Conference of the Building Trades, in its struggle against the Master Builders, has been made manifest; and it is now tolerably certain that, although the men may still inflict upon themselves an increased amount of loss and misery, they must eventually yield. Then we have witnessed the crusade of the *Times* against the functioneering tyranny and insolence of the Post-Office authorities, and the usual inconsistency of that journal in the matter of the *Great Eastern*; for after having praised even the defects of that vessel, it now discovers that it is but a gigantic folly. The Social Science peripatetics have also gone through their annual farce, and uttered their usual amount of nonsense and falsehood upon the great moral and social problems of the day; oddly enough, too, with their usual impunity and apparent success, so hard does it seem to be, even in a Protestant country, to induce men to examine the value of the authorities they accept. We have also witnessed the late Speaker of the House of Commons congratulate the educational bodies of our age upon the really disgraceful fact that there are very few of them which do not receive aid from the Government funds; as though it were desirable that, even in their earliest years, the citizens of a free country should be taught the lesson of dependance upon the State rather than upon their own energies. Moreover, there have been certain events in the history of Civil Engineering of an extremely interesting nature to which we will refer in the sequel of these remarks, after dwelling upon two of the most important details, connected with Sanitary and Engineering operations, which took place at the Bradford Meeting.

The first of these was the formation of a separate section for the purpose of facilitating the adoption throughout the world of a uniform system of weights and measures; or rather, if we read the discussions aright, of the adoption of the French metrical system. Now we beg, firstly, to observe on this subject, in order at once to obviate any possible personal imputations, that we ourselves have for many years habitually employed the said metrical system; and that no one can be more intimately persuaded, than we ourselves are, of its superiority to the complicated, arbitrary, and illogical systems which are used in other countries. But we are very far indeed from thinking that it is therefore advisable to carry out the logical principles of such matters to their extreme applications; nor are we prepared to admit that even the illogical differences which now exist between nation and nation in their weights and measures, their language, or the intimate details of their social existence, ought to be of necessity effaced. Some years since there was a great movement amongst the philosophical world in favour of a universal language, and in the latter end of the seventeenth century many very able and learned works were written upon the subject; and, indeed, we think that it cannot be denied, that if uniformity of weights be desirable, it would also be desirable to bring about a uniformity of speech. But this question at once arises, viz., would not the world lose more by such uniformity than it would gain? All national individualism, if we may use the Hibernicism, would be destroyed at once, if the local peculiarities of speech, and consequently of modes of thought, were obliterated; and the assimilation of the weights and measures of all the world would, "*pro tanto*," be a step in that direction. As it is, with our improved means of transport, our improved postal arrangements, and our electric telegraphs, Europe is rapidly becoming civilized into uniformity; and original, vigorous, national modes of thought are becoming more and more rare. It may well be that the increased development of this tendency may have seriously dangerous moral consequences; and we therefore would recommend our would-be philosophers carefully to weigh all the metaphysical conditions which are likely to attend even the apparently practical question of a uniformity of measures.

To our minds, it is also unfortunate that the advocates of this uniformity should have selected as their chairman and representative a man like Michel Chevalier, notwithstanding his deservedly elevated position in the scientific ranks. There ought to be little confidence in a person who could, as Michel Chevalier did, begin life as an ardent Saint Simonian, then become a devoted servant of the government of Louis Philippe, and finally accept the position, unnecessary servitude, of a Prefect under the present despotic system of France. Of course it would be ridiculous to seek for consistency of principles, or of conduct, amongst the members of the central administration of our neighbours; but it certainly is desirable that the men who are supposed to represent the moral ideas which are to modify the face of society, should be men entitled to personal respect, and be above the suspicion of being needy times-servers. Be this as it may, M. Chevalier is a

scholar, and so we commend to his notice the reply of his own great countryman, Descartes, to the inquiry by the Père Marsenne as to the value of Kircher's scheme for a universal language. To our apprehension the observations of Descartes apply with equal force to the weights and measures scheme. He says, in the cramped Latinity of his age, "*Existimo possibilem esse hanc linguam, et reperiri posse scientiam eam ex qua illa pendet, cujus certe beneficio rusticus quispiam de rerum veritate posset melius judicare quam jam philosophus aliquis. Sed ne speres te unquam visurum illam in usum; et tam magnas in orbe mutationes supponit, essetque necesse totum orbem in terrestre paradisum converti, quod sane in fabulas tantum locum habeat.*"

The "Sanitary Science" matter to which we most particularly wish to refer, in connexion with the Bradford meeting, is the speech of Mr. Cowper to the Public Health section. On many previous occasions we have felt it to be our duty to recall to the attention of Mr. Cowper that the assertions of his "crammers," and the facts he was supposed to represent, were diametrically opposed to one another; but this delicate mode of contradiction seems to be lost on Mr. Cowper, as it usually is, we would observe, on all Heaven-born statesmen of his class. It is now, therefore, necessary to lay aside considerations of polite reserve, and to call things by their proper names in discussing the theories uttered, or the tales told, by these men, and therefore we at once will proceed to examine the history and the inferences drawn thencefrom by Mr. Cowper, when he pretended to describe the proceedings of the late General Board of Health.

Firstly, and to take the observations of Mr. Cowper in the order he has himself adopted, we would remark that the ridiculous nonsense of "the circulation *versus* stagnation" theory has been so long exploded that we are surprised that even a Whig centralizer should repeat it, after the notorious commercial failure of the Rugby experiment. Mr. Cowper must know, or he ought to know, that so far is it from being true that that experiment has been attended "with profit," that the public-spirited man at whose expense it has hitherto been carried on loses money every year that he continues it; and in strict justice the Local Board ought rather to pay him a yearly sum for relieving them of a burthen than to receive a rent for the sewerage of their town. Secondly, as to the prevention of the discharge of sewerage matter into the natural watercourses of the country, it is perfectly true that such a course ought to be prevented; but, in fact, it will be found that all the towns whose plans of sewerage were designed by the officers of the late and of the present sanitary authorities of the country, were designed upon the principle of discharging the collected sewerage, *without disinfection*, into those watercourses. The practice of the late Board of Health in this matter was most recklessly unprincipled, and the present sanitary authorities of the country are as culpably negligent; for they have had ample opportunity, which they have not seized, to introduce a general legislative measure to protect from pollution our rivers and streams. Thirdly, as to the official analysts Mr. Cowper desires to appoint, in order to control the malpractices of merchants of eatables, we would ask who is to guarantee their ability or their infallibility? We have seen that both Dr. Normandy and Dr. Hassall have been made the victims of very transparent hoaxes, and that the latter gentleman allows his name to be used as a puff for certain goods. Surely after these exhibitions, there can be little confidence in their "authoritative decisions;" but who is there in whom the public ought to place implicit reliance? Besides this, the analysis of a small sample, such as would be brought to, or be taken by an official analyst, would be neither be an indication of the real composition of a large stock of goods, nor would the chance of detection of a fraud of this kind be any guarantee to the public. The nomination of a body of officials of this description would, no doubt, confer an additional amount of patronage on the Central Government, but the good it would confer on the public is more than problematical.

As to the assertions Mr. Cowper made with respect to the improvement in the rates of mortality by the execution of drainage works, we are quite prepared to admit their general correctness, though at present we reserve our right of judging the precise figures of the rates of mortality, formerly and now; and also of apportioning the amount of gratitude we owe to the draining operations. Evidently the rapid and effectual removal of refuse, and the copious supply of pure water, must tend to improve the sanitary state of a locality; but the general ease and comfort of a community have nearly as much influence upon its death rate as the surrounding atmospheric phenomena; and it is notorious that England has been singularly prosperous of late, and that its working population, especially, has benefited by the operations of free trade. Moreover, our climate within the last three years has assumed a very unusual character, and we think that, under these circumstances, it is premature to congratulate ourselves on the success of our recent works, when a possible return to the ordinary state of things may render the average derived from a cycle of our climate very different from the one which has hitherto prevailed.

But the portion of Mr. Cowper's address which we do not hesitate to stigmatize as being wilfully false is the one wherein he pretended to describe the action of the late "distinct sanitary department of the Government." According to Mr. Cowper, this body executed no centralizing action—but it is notorious that it only allowed local authorities to execute sanitary works which were approved by its own officers; and it is equally notorious that local authorities were distinctly told that it would be to their own interest to employ exclusively the officers of the Board of Health as their professional advisers. Moreover, it was a part of the policy of that Board never to allow a servant of the local authorities, who had shown himself to be devoted to itself, to be discharged by the men who were supposed to employ such servants. We ask any reasonable man what more stringent central action than this could exist? The local authorities could neither act to initiate a measure, or to discharge their own servants, without the consent of a Board sitting in London! Mr. Cowper talks about the information collected and circulated, and the reports on sanitary questions issued by the Board; but we have ourselves frequently had occasion to prove that the so-called information was utterly valueless, even when not false; and we repeat that the countless blue-books issued by the General Board of Health were a disgrace to the scientific reputation of England. Ah! if the existing system should be nothing more than the Phœnix of the last one, the public should at once bestir itself to knock such a mischievous bird on the head.

But to turn from this discreditable and unpleasant tale to the hard realities of life, we would urge all parties who are interested in the permanent prosperity of our country—or, in fact, of the prosperity of civilized Europe—to reflect that all their energies may soon be required to meet the difficulties we are likely to encounter from the bad harvest of this season, the disturbances in the atmospheric conditions of North Western Europe especially, and the senseless strikes which have diminished the resources of our working population. Revolutions usually follow bad harvests, and unfortunately there are few continental nations which do not contain the germs of such movements; but apart from this abstract general consideration there is the immediate one of the effect of scarcity upon the comfort and the happiness of our fellow-creatures. Then, with regard to the atmospheric conditions to which we refer, they seem already to affect seriously several of our nearest neighbours, and doubtlessly they will soon affect ourselves. The cholera which has during the summer exercised such fearful ravages at Hamburg, and in East Friesland, has now reached Brussels, Antwerp, Bruges, Rotterdam, and Amsterdam, in its usual unaccountable progress from east to west; whilst here in London the small-pox is said to be exercising unusual ravages, and in America the yellow fever is carrying off great numbers. The simultaneous outbursts of the cholera in Holland and Belgium, and of the small-pox here, remind us, we would observe, of a very remarkable passage in the very remarkable book entitled "*De la Dégénérescence physique et morale de l'espèce humaine*," *par Dr. Verdé-Delisle* (Paris, 1855). The passage we allude to occurs in a quotation from the description given by M. Bousquet of the autopsy of a person who had died of the small pox (pp. 44 and 45 of Dr. Delisle's work); and in it M. Bousquet describes the blood of the subject as existing in a peculiar serous state, which strikingly resembles that which has been stated to prevail in choleraic subjects. Now it by no means follows that this analogy is complete, or that even, if it were so, the single symptom referred to would prove much towards establishing any connexion between the disease called the cholera and the one known as the small-pox. But it seems to us, firstly, that there may be some truth in the theory propounded by Dr. Delisle, to the effect that the small-pox is in itself a very necessary "derivative" of certain humours in the constitution, and that, therefore, the suppression of this natural mode of clearing the

constitution may be attended with permanent dangers, amongst which must be included the probability of the development of new forms of disease; and, secondly, that it is worthy of especial inquiry whether the victims of cholera have, or have not, been at any period of their lives especially subject to the effects of either inoculation or of vaccination. The tax-paying British public has lately been favoured by a blue-book on the latter subject, but it seems to us, personally, to leave all the philosophical questions connected with it in uncertainty; and it is, therefore, with deep anxiety that we now call attention to some points which we believe to require elucidation. At the same time we would suggest to those who are more competent than we ourselves are to investigate these matters, that it would also be worth while to endeavour to discover the connexion between the typhoid fevers which have this year desolated Holland and the outburst of cholera in other districts. Dr. Delisle says distinctly that the typhoid fevers have been more common than they were wont to be before the general introduction of vaccination. Is this correct?

Whilst these medical subjects are before our notice we may be allowed, perhaps, to call attention to a rather obsolete discussion which is going on amongst our French neighbours. They are, in fact, fighting over again the battle waged here some years ago with respect to the disinfectant properties of Boghead ash, without, be it observed, throwing any new light on the matter. But, in addition to this, it would seem that some of their therapeutists have "discovered" Bishop Berkeley's Essay called "Siris, a Chain of Philosophical Reflections and Inquiries concerning the Virtues of Tar Water"—(a most singular production, by the way, which has well been described as "commencing with the praise of Tar Water, and concluding with the praises of the Trinity")—for they have of late made a very great fuss about the disinfectant properties of Tar mixed with plaster or with loam, and have declared it to be "the sovereign'st thing on earth for an *outward* bruise," very much as Berkeley had done before, in far more elegant language than his French copyists have lately employed, and with quite as much truth. Some day or other we may give an analysis of the reverend Bishop's theory, if our readers should express any interest in the matter.

And then again, to dispose of French matters at once, we would call the attention of our readers to the notice inserted in our number 181 (page 523 and subs.) of the works about to be undertaken for the improvement of the water supply for Paris. We do this, particularly, because the French Engineers are often very deservedly held up as models for imitation in other countries: and French principles of administration, and of political economy, are equally objects of admiration. In the notice referred to, however, there are some remarks which display so utter an ignorance of the true principles of social economy, and of the practical details of Engineering science, that we feel bound to record at once our protest against the doctrines and the errors so propounded. The first proposition (in the order of importance at least) to which we take exception, is the one which pretends to solve at once the problem as to whether, or not, it be desirable to incur at once a very high original outlay, without any subsequent heavy working expenses; or to adopt a system originally cheaper, but burthened with a costly annual maintenance and working. In imperial governments, wherein annual deficits are the rule, not the exception, it is no doubt very fine to dwell upon the considerations of national grandeur, and the other magniloquent phrases which disguise for a time the national bankruptcy; but in honest states, the question we have referred to will be solved by appeals to reason, not by flashy sentiments; and it will always remain, in the eyes of calm reasoners, a mere matter of calculation whether eventually it would be cheaper to set aside the interest of the capital supposed to be required for the execution of the more costly system, in order to cover the working expenses of the cheaper one, or at once to execute the more costly and permanent work. As for posterity, it may fairly be left to take care of itself; and we hold that any municipality which provides for its possible wants for a period of thirty years does all that ought to be required of it. The second proposition to which we take decided exception is the one connected with the use of steam-engines; and we cannot express our opinions, in more simple or decided terms, than by saying that evidently the French Engineers neither understand, nor can they appreciate, the powers or the capacities of the Cornish Engine.

Our remarks have already extended to such a length that we are compelled to defer for the present the consideration of the important practical question involved in the respective Reports of Messrs. Pole, Gotto, and Roberts, on the subject of the quantities for the Intercepting Northern High-Level Sewer; or to the more generally interesting question of the Harbours of Refuge, brought so prominently before the public at the banquet of Holyhead, or in the Reports upon Bristol and Milford Haven. We must also, for the same reason, defer our reply to the *Times* upon the subject of the persecution of Mr. Croll, and upon the comparative states of the Metropolitan water supply, and that of Glasgow and of some other localities. We are anxious, too, to pay our tribute of respect to "the mighty dead," whose loss we all of the Engineering profession so deeply deplore, and therefore we reserve these questions to other and more convenient times.

## STEPHENSON AND BRUNEL.

*"Sic mihi tarda fluunt ingratæque tempora, quæ spem*
*Consiliumque morantur agendi guaviter id, quod*
*Æque pauperibus prodest, locupletibus æque*
*Æque neglectum pueris senibusque nocebit."*—HORACE.

FROM the days of Horace, or even, if we read the inspired volume aright, from a long antecedent period to his day, down to the times of Addison or of Young, poets and moralists have alike united to deplore the feverish anxiety with which men struggle after the ostensible objects of ambition, whilst they neglect the real aims and objects of life, properly understood, until they are too old, or too much exhausted, to be able to enjoy them. There are, we fear, few occupations in our modern organization of society wherein men are so liable to be led into the fatal error thus referred to as in the Engineering profession; and as the recent lamented deaths of Messrs. Stephenson and Brunel seem to us strikingly to elucidate the moral of the tale connected with the use and abuse of life and strength of which Engineers are too often guilty, we propose to dwell somewhat upon the incidental reflections which have been excited by the loss of those eminent men.

As to the men themselves, it would be superfluous for us here to give again a sketch of their lives, or a detailed appreciation of their respective merits. Every journal of the empire worthy of notice has given a more or less complete biography of Stephenson and of Brunel, and has attempted, with more or less success, to utter an appreciation of their services to society. "Their praise is hymned by loftier harps than ours;" and it would serve but little to repeat again the oft-told tales of the difficulties they overcame, and of the triumphs they achieved, in the course of their professional lives. It must not be supposed, however, that we especially would seem even to attach small importance to the moral grandeur, or even to the worldly value, of the faculties required to ensure success in the arduous struggle attending the introduction of the railway system, with which the names of Stephenson and Brunel will be inseparably connected; nor do we yield to anybody in our admiration of the grasp of intellect or the creative genius which enabled them to design and effect so many improvements in the arts of construction. Nobly and well did these men carry forward the lamp of scientific knowledge they had received from their predecessors, and most unquestionably have they introduced modifications in the details of Civil Engineering which will mark the last few years amongst the brightest epochs of that art. Practically acquainted, too, as we ourselves are with the difficulties these men must have overcome, from the mere fact that every engineer has to deal with them in his own walk, it would be worse than ridiculous for us to speak lightly of those difficulties. But, as we said before, it would be but "to gild refined gold, to paint the lily," were we to record our opinions on the merits of the men who, in their respective spheres, have so materially changed the external form and expression of our civilization; and therefore, whilst we are anxious to record our sincere and humble tribute of respect to their memory, we would wish especially to derive from the history of these mighty dead lessons which might be of use to their survivors. The supreme genius and talent which enabled Stephenson and Brunel to alter the whole external character of the constructive arts of their age, are of course the attributes of a very small class: the lessons to be derived from their careers may serve for all.

Now it seems to us, firstly, that both Stephenson and Brunel have, in their own peculiar ways, illustrated the superiority of our English "free trade" in art and science over the very narrow systems which prevail in countries where organized systems of education and examinations are in fashion. Both

these men, in fact, made their own positions in life, and, by their own individual characters, worked their ways to fame and fortune; both of them also retained the individual character of their own genius, and kept themselves free from the trammels of pedantic schooling. Secondly, it seems to us that the manner in which public opinion has expressed itself upon their loss ought to teach our heaven-born statesmen that the days are gone by when a nation's honours can be confined to a few intriguing, place-hunting, back-stairs politicians. Nearly all the hereditary Whigs or Tories of the peerage might be annihilated to-morrow without provoking a regret, or giving rise to the spontaneous demonstrations of respect which accompanied the remains of that great and good man, Robert Stephenson, to his long home amongst England's worthies; yet during their lives the Government, which could confer titles, pensions, and places on such creatures as the Phipps, the Chadwicks, the Halls, the Lloyds, the Elliotts, the Cowpers, &c., could not bestow on either Stephenson or Brunel a dignified token of the official appreciation of their merits. It may be that our Government has a truer sense of the value of the honours it confers than the public in general, and that, as Horace said, "*redere personæ scit convenientia cuique*," and therefore it refrained from disgracing our great Engineers by the titles so generally wasted on worthless favourites of the Court—"*eo magis perfulgebant quo minus videntur*." But the public is beginning to inquire why these things should be, and why it is necessary that civil merit should remain unrecognized in a country which prides itself on its civilization?

The third and most important lesson to be derived from the deaths of Stephenson and Brunel, or equally from those of Rendel and Alexander Wright, seems to us to be that the active, energetic pursuit of a profession like that of Civil Engineering, as it has become of late years, is highly destructive of human life. All the men we have named were men naturally of strong constitutions, and the amount of mental and physical labour they went through must have been fearful. The consequence was that none of them attained the age of 57, and they fell victims, ultimately, to attacks of disease which they would, no doubt, have shaken off easily when in their natural state of health. It really would seem that Engineers, to use a vulgar phrase, "burn their candles at both ends" when they are men of genius, and in serious earnest in the pursuit of their profession. We suspect that this is not a properly-balanced frame of mind, and that there is something wrong in the immoderate pursuit of fame and fortune which it indicates. Yet who can say that this was the case when Stephenson found time, and seized every opportunity, for rendering himself so beloved that he was followed to the grave by such troops of sorrowing friends as to render his funeral almost equivalent to a national testimony to his worth? What a life that must have been which inspired such regrets! Gentle and simple, high and low, were present on the occasion; and legislators were mingled with hard-handed, noble-hearted mechanics to render homage to the man who had proved himself to have been not only the ablest, but one of the kindliest and most generous characters, of his age! The bitterness of death would be soothed to Stephenson's surviving friends by a nation's grief for their bereavement. As to Stephenson himself, let us hope that he lost nothing—nay, rather gained—by the passage from time to eternity. It is not for us to reason on these subjects too curiously; but this we certainly may do, viz., strive to appropriate to ourselves the merits and virtues of the deceased, that when we too are gathered to the dust to which all must return, we may leave behind us as endeared, and as enduring, a memory as Robert Stephenson has done. Perhaps, also, we should do wisely to follow with less exclusive devotion, than either of the great men we have referred to seem to have done, the pursuit by which our worldly position is to be secured. They themselves might have enjoyed a longer career of usefulness, and rendered service to society for a longer period, had they been content to measure the expenditure of their faculties and of their strength.

## SUPERANNUATION AND SICK FUNDS.

Some time since we observed—and the remark has brought upon us the censure of some of our readers, from whom we should have expected a more charitable interpretation than we have been favoured with—that much of the antagonism which unfortunately prevails between the representatives of capital and labour, may be attributed to the want of personal sympathy to be discovered, we regret to say, at the present day between the respective classes of employers and employed. The tone and character of the documents issued by the Trades Conferences and the various Trades Unions seem to us to prove that the position we then held is a true one; for in those important, but singularly mistaken, documents, the whole line of argument adopted by the leaders of the "working" men, as they ostentatiously call themselves, is based upon the principle that Capitalists are nothing else than a ravenous brood of vampires, who thrive upon the misery and sufferings of those whom they employ. All the exploded nonsense of the socialists of the Sue, Louis Blanc, Ayguals de Izco, Carcano, Guerrazzi, and Kingsley school, has of late been revived; and we have heard again the old furious declamations against "tyrant masters," the "wrongs of labour," and the "*exploitation de l'homme par l'homme*." Of course allowance must be made for the excitement of the contest which is, unfortunately, still lingering on; but the mere fact that this particular line of argument should have been resorted to, seems to us to indicate that there is a deeply-rooted feeling amongst the labouring class to the effect that, at the present day, their interests are directly opposed to those of their employers; and, at the same time, it seems also to us to prove that the class of employers, as a class, have neglected to avail themselves of many of the opportunities they must have had within their grasp, of proving to their men that, in sober, earnest truth, they knew, and were determined to prove, that no such antagonism ought to exist. Fortunately, even for the workmen themselves, the recent movements of the intriguing chiefs of the Trades Conference have been unsuccessful; and though the masters have suffered very heavily in the contest, they have been, in the main, the victors. We say fortunately, because there is not upon record a more unjustifiable strike than the one we have lately witnessed in the metropolis; and if the Conference had carried its point, the working men would have found themselves in a far more humiliating and painful position than the one they now occupy. But this struggle being ended, it behoves the employers to weigh seriously their past conduct, and to strive at once to remedy any portions thereof which may have served, even indirectly, to justify the reproaches of the men; and, above all things, to endeavour to prove to them that they feel in their heart of hearts that, however men's positions in society may differ, there is a bond of brotherhood running throughout mankind, and that, in fact, not in words only, the interests of capital and labour are so closely allied, as almost to be identical. How is this to be done?

Many conscientious and enlightened men have already partially solved this problem, by establishing amongst their workmen associations for the purpose of providing against the wants of old age, or the forced cessation of labour, and the loss and expense of sickness. Numerous institutions exist for the improvement of the intellectual faculties of the workmen, and for the avowed purpose of providing them with a more elevated class of pleasures than those they were formerly almost compelled to resort to. Perhaps even there has been somewhat of an impertinent intrusion of charity upon the poor; and, at any rate, many of the modern charitable institutions, such as the baths and washhouses, the model lodgings, the soup kitchens, &c., with the very best intentions on the part of their originators, have been in the end productive of as much moral injury as they have conferred temporary benefit; for those institutions act in a manner to diminish the feeling of self reliance which is the truest guarantee of the permanent worth of mankind, and they have fostered the modern tendency to call for State intervention in matters of private detail. But the institutions for the improvement of the labouring classes, or for their relief, and protection from the inevitable misfortunes of life, which are based primarily on the condition that the persons who are to be relieved should themselves exercise the virtues of prudence and self restraint, seem to us to be free from this objection; and it equally seems to us that it is the duty of the more fortunate, and the more highly educated classes of society to assist such institutions by their council, their personal intervention, and their active assistance. Great tact is of course required to prevent the labouring class from imagining that such conduct is either dictated by impertinent curiosity, officious intermeddling, or by any modification of personal interest; but the more personal and direct the intercourse of employer and employed may be in works of mutual charity and good-will, the deeper and the truer will be the sympathy between them. The manner of doing these things is in fact

as much as the form and character the things themselves may assume. It is not by subscribing large sums of money to a literary institution, to a sick or a benefit fund, that the working men can be made to feel that their masters are their friends. Far from it: the working class are singularly acute in discovering the trail of vanity, or of self interest, which may be in such actions; but they are equally acute to discover when the hearts of their employers are with them—and we know few more striking illustrations of this fact than the spontaneous tributes of respect paid by the working people of the shores of the Tyne to the great and good Robert Stephenson. We mean, in fact, to hold up to admiration the conduct of those who have shown that their charity is not a mere dead form, but a living active virtue, of a real worky-day character, sweetening and harmonizing every detail of life, and every relation of society.

Virtues of this description are, as we said, purely personal, and as such it is impossible to suggest any manner in which they can be exhibited as between the shareholders of a large Company and their servants; though unquestionably the Directors and Shareholders themselves, if they were deeply impressed with the sense of their moral responsibility, would easily discover modes of displaying their feelings. But, even in their corporate capacity, the Directors of such companies could and ought to do much towards the encouragement of habits of forethought amongst their servants, and towards interesting them in the success of the operations with which all the respective parties are concerned. In the administration of the great Paris Gas Company this question seems to have been very earnestly and very properly studied, so far as the physical necessities of the workmen are concerned; and we would beg some of our London Companies to study the example thus set. There is in this Paris establishment a regularly organized system of medical relief; a surgeon—or, if required, a physician—attends regularly once a week at every one of the Factories, or at the various offices; there is a complete dispensary for medicines; and if the personal services of the medical officer are required at the domicile of the workman, they are given—and all this is done gratuitously. Then there is a relief-fund against sickness, under the guarantee of the Company, and liberally supported by it; together with a retiring-fund, by means of which the servants of the Company may make provision against old age and infirmity, to which the Company also contributes liberally. No doubt many of our public Companies do quite as much for their servants, but we are not aware that any of them do it in the same systematic and general way that the Paris Gas Company does, and therefore we have felt it to be our duty to call attention especially to the proceedings of the latter.

Of late a movement in favour of a general measure for the establishment of a Provident and Superannuation Society appears to have arisen amongst some parties connected with London Gas-Works, and we have been requested to co-operate in the matter. This, it seems to us, we can most readily and most effectually perform by provoking an expression of opinion from the various representatives of the Gas Companies, and by collecting and comparing the statistics of the pursuit, and the statutes of analagous institutions at home or abroad. We shall spare no labour or expense to perform this which we consider to be a sacred duty, and we appeal with confidence to our professional brethren, and to the public generally, for assistance and support. Emphatically do we repeat that it is by such measures as these that masters and men become honourably and truly united, and that the recurrence of the fatal strikes of this year will be prevented. An earnest effort made *now* to renew the shaken bonds of sympathy between employers and employed would be attended with a success which could not be hoped for in other times; but whether this be, or be not, a mistaken view of the importance of the precise epoch, the end proposed should not be lost sight of, and we should all labour in our respective spheres to prove that—

"It's coming yet, for a' that,
That man to man, the warld o'er,
Shall brothers be, for a' that!"

## Circular to Gas Companies.

The communications addressed to us relative to the section of the "Act for regulating Measures used in Sales of Gas," which probibits an inspector from stamping any meters that shall be *capable of being made* to register more than 2 per cent. in favour of the seller, or 3 per cent. in favour of the consumer, by any increase or decrease of the water in such meter, "or by any other means practically prevented in good meters," are so numerous that we are unable to reply to them in detail; but the end the writers of these communications have in view will probably be accomplished by a general outline of the tests to which, in our opinion, consumers' meters will be subjected in order to ascertain whether they conform to the requirements of this section of the Act.

In a previous notice we confessed our inability to comprehend with precision the *rationale* of the test for soundness prescribed in the XIIIth Section. The 3-inch pressure there indicated can only be of use in testing the soundness of the *outer case* of a meter, and is inoperative for testing the soundness of the *internal parts* of the machine. For this latter purpose the simplest plan is to reverse the inlet and outlet pipes by attaching the supply-pipe to the outlet of the meter, leaving the inlet open, and propelling the meter backwards under a pressure of about 2-10ths, till its motion is stopped by the ratchet catch. If the meter is perfectly sound, the passage of gas will then entirely cease, and the test gasholder will be stationary; but if it descends, some internal leakage between the parts is indicated, and should this leakage exceed ·03 of a cubic foot for every cubic foot of the measuring capacity of the meter per hour, the meter ought not to receive the inspector's stamp. Thus, should the leakage of a meter of which the measuring capacity is stated on the badge to be 20 feet per hour, exceed 6-10ths of a cubic foot per hour, it is in excess of the tolerated capability to register incorrectly; and though the test may not have been performed in the manner directed by the XIIIth Section, it clearly comes within the provisions of the XIIth, while its simplicity and the ease with which it may be performed will render it more correct in unskilful hands than the complicated test indicated in the first of the above-named sections. The only possible source from whence errors can arise is from changes in the bulk of the gas or air in the test gasholder taking place in consequence of changes of temperature while the operation of testing is being carried on; and this induces us to reiterate the advice we some time since gave, that, for all experiments upon volume, atmospheric air drawn from the testing-room is preferable to gas taken from the mains, as the latter may vary several degrees from the temperature of the room, and hence derange the experiments, or necessitate a variety of corrections in the results. Nevertheless, if gas is at any time used, we should recommend that the inlet-pipe of the test gasholder should be constructed so as to form a worm or coil of considerable length in the tank, in order to allow the gas to acquire the temperature of the water in its passage through the pipe, and thereby, as far as possible, assimilate the temperature of the gas to that of the room. The effect of a change of 10° of temperature would be to alter the bulk of the contents of a 10-feet holder filled with gas or air to the extent of 352 cubic inches, or, in round figures, nearly the fifth of a cubic foot; and as the temperature of gas in the mains is often 30° below that of the atmosphere, the importance of these suggestions may be appreciated.

Having thus tested a meter for soundness, it may next be tested to ascertain its capability for being made to register quantities varying from the tolerated per centages of error by any contrivances practically prevented in good meters. For this purpose a wet meter should be first emptied of its water and placed on a horizontal base. The inlet should be connected with the test gasholder, to which a pressure of 5-10ths should be applied. The outlet should then be vented, all the plugs removed, and the gas turned on. If any gas passes it indicates unsoundness in the valve, but if the meter is sound in this respect, water of the temperature of the room should be poured in (the plugs being still out) till the valve is sufficiently raised by the float to allow one light to burn steadily. If gas then escapes at any of the open plug holes, it should be ascertained whether that gas is registered by the meter index, and should it be found not to be registered, the defect is in our opinion fatal to the meter; but if the gas is registered, the plug may be replaced, and the experiment may be continued. The meter is now in a condition to be tested for per centage of error at the low water-level, and this will be performed more accurately by counting the revolutions of the drum than by observing the meter index. Atmospheric air is, however, indispensable in the first-named mode of operating, and the inlet of the meter should consequently be connected with a test-

ing-holder filled with air to zero, and adjusted to give 5-10ths pressure, the outlet of the meter being left open for the purpose of observing through it the revolutions of the drum. A mark should be made upon the latter with paint, and the air being then turned on, each passage of the mark should be counted; and as all meters are for the future to have inscribed on them the quantity of gas delivered at each revolution or complete repetition of the measuring machinery, the quantity which ought to be passed by any known number of revolutions may be easily ascertained. Thus if an eighth of a cubic foot should be delivered at each revolution, thirty-two revolutions should exhaust a 4-foot holder, and the experiment on such a meter should be stopped when the mark on the drum has arrived for the thirty-second time opposite to the outlet. The index of the holder should then be read off, and if it is more than 4·12 feet, the tolerated variation from truth is exceeded, and the meter should be rejected. Meters delivering a quarter of a foot at each revolution should be thus tested to sixteen revolutions; those delivering half a foot to eight revolutions, and those delivering one foot to four revolutions. For larger sizes a larger holder will be required, as less than four revolutions are not a sufficient experiment.

To test a meter at the high water-level, all the plugs should be inserted, and water of the temperature before mentioned should be added till the passage of air through the meter is stopped. The water which has overflowed and flooded the syphon should then be withdrawn by taking out the syphon-plug at the hole specially provided for that purpose, and when the water has completely run off the plug may be replaced. The test for per centage of error at high water-level may then be made exactly in the manner described for testing at the low water-line, and if 4-foot holder index should indicate less than 3·92 feet, the variation from truth exceeds that permitted by law, and such a meter should be rejected.

There still remains to be described the test for determining whether the index gives an accurate record of the revolutions of the measuring-drum. This has hitherto been the only test to which meters have been subjected, and as the method of conducting it is so well known, we need not further allude to it. It is the only one that can be applied to dry meters out of the manufacturer's premises, unless a hole be made in the top through which the revolutions of the crank pin may be counted, which plan, we apprehend, is the one that will be adopted by the manufacturers, such hole being ultimately covered by the inspector's stamped badge.

There are several other contrivances by which the registration of wet meters may be more or less affected, but as they partake more of the character of fraudulent tricks than of legitimate tests, it would be impolitic in us to allude to them further. We believe the tests we have indicated comprehend all those to which meters should in fairness be submitted, and that all meters may be accepted as complying with the conditions of Lord Redesdale's Act which have successfully undergone such an examination. The small range allowed for the float in wet meters will cause many difficulties if the proper supply of water is not more frequently adjusted than has hitherto been the practice of gas companies; but this is a question totally distinct from that of the correctness of the instrument itself.

An absurd impression seems to have been studiously promulgated by the opponents of gas companies, that this Act is distasteful to them, and has been passed in spite of their ill-concealed opposition. Nothing, however, can be further from the truth, and we read with pleasure the observations of the Governor of the Imperial Gas Company on this subject at the last half-yearly meeting of that powerful company—sentiments which we venture to affirm will be endorsed by the directors of every gas company in the United Kingdom. They are, indeed, too well aware of the advantages of having some tribunal to appeal to in case of disputes with customers as to the accuracy of their meters, to induce them to oppose even an imperfect measure, much less one in which their representations have been duly considered. The ignorance of the press generally on all that relates to this subject is remarkable. The *Daily News*—a paper which is usually careful in the articles it inserts—recently published two leaders filled with the most gross misrepresentations with respect to the conduct of the metropolitan gas companies, and reiterating all those grivances of consumers which this Act is intended to remedy. It is surely one of the duties of those who guide public opinion to be exact in their statement of facts, and when we find it deliberately stated that though "the law provides in the interest of the public an inspector of weights and measures for coal, corn, cheese, tea, and other commodities sold by measure, but not for the inspection of the measure of gas," we may fairly doubt whether those duties have been faithfully performed.

The metropolitan gas "reformers," as they call themselves, have commenced proceedings, preparatory to the forthcoming parliamentary campaign, with considerable activity. We noticed in our last the three circulars issued with a view to the collection of the necessary funds, and in another part of our present number will be found reports of two meetings relative to the supply of gas to the metropolis; the first one having been held by the delegates themselves, to arrange the tactics to be adopted in the next session, and the other being a meeting of the Westminster District Board of Works, at which the proposed bill was discussed in reference to the negotiations now pending with the Chartered Company for the lighting of a portion of that district. The agitators seem scrupulously desirous to get up a case of grievance against the Chartered Company in Westminster, in order to support their bill in Parliament by making it appear that they are placed at the mercy of exacting monopolists, who are enforcing the acceptance of terms for public lighting which are opposed to reason and to justice. When we state that Mr. Beal, the honorary secretary of the delegates, and Mr. Hughes, their honorary engineer, are the acting parties in this movement, it is scarcely needful to add that they make an abundance of assertions founded on assumptions which their own figures and previous statements contradict. The most tellable point they make against the company is, that the directors object to have introduced into the fresh contract the novel proposition to measure the quantity of gas burned by meters placed at every twelfth lamp. This objection was strained into an implication unfavourable to the fair dealing of the company, but it was subsequently explained that the principle of measurement was not objected to, but the mode of measuring. The directors had, indeed, proposed to have a meter placed at each lamp, which is the only accurate method of ascertaining the quantity consumed, but they reasonably enough refused to have the total quantity consumed estimated by the measured number of feet supplied to one lamp in twelve, especially when it was proposed to light the lamps by the servants of the vestry. Such an arrangement would introduce uncertainty where it was intended to ensure correctness, and would be a constant source of dissatisfaction, whether the lamps were lighted by the servants of the company or by those of the parish. In expressing this opinion, we are only reiterating the observation of Mr. Beal at the meeting of the metropolitan delegates, who, when endeavouring to establish a different grievance, said, "One fruitful source of complaint is the irregularity of registration with the same number of burners." It is ever thus, that by want of concord in their grievances, the delegates make the enforcement of one a complete answer to another. Mr. Hughes brought his logical powers to bear on this point, with his usual success, at the Westminster meeting. All gas-men, he said, are familiar with the mode of ascertaining the consumption of gas per hour by the consumption per minute; and as this method of computation is found to be accurate when one burner is employed, *ergo*, it must be equally accurate with twelve burners, each of which may be adjusted to consume a different quantity!

Mr. Hughes repeated at the meeting the assertion in his printed circular that the price paid for public lighting does not affect the charge to private consumers. Such a statement, according to the honorary engineer, is a great delusion and a bugbear. "He would like to know a single instance in which the private consumer had been affected by the price charged to the public lamps. He would venture to say that no such instance could be adduced." Mr. Hughes is a bold man, and ventures to say many things that less daring spirits might hesitate to utter; but we thought the instances adduced in the last number of the JOURNAL, from his own printed statement, would have somewhat staggered his confidence. Since, however, he would still like to know another instance, we will adduce one respecting which there can be no doubt, if his own circular is to be relied upon. The price charged for gas supplied to the public lamps in Liverpool is there stated to be 4s. 1d. per 1000 feet, the charge to private consumers being 3s. 9d. Now, as the price of gas in that town is regulated by the amount of dividends received by the gas company, it must be evident to Mr. Hughes's logical mind that, if a lower price were paid for the

public lights, the company's receipts would be less, their dividends would be reduced, and that the consumers must be charged a higher price to raise the dividends again to their maximum of 10 per cent. We trust Mr. Hughes will be satisfied with this proof, he has himself afforded, that the "great delusion" is all his own, and that the "bugbear" is a reality.

The report of the honorary engineer to the delegates is rich in contradictions and misleading assertions, which, were it worth while, could be easily exposed; but we shall merely notice that in one place the advantages of competition are upheld by him, as having occasioned great reduction in the price of gas, whilst in another place he bears evidence to the correctness of the opinion we have frequently expressed, that the wasteful expenditure formerly caused by competition is the principal obstacle to further reduction.

Of all places in the kingdom where an agitation for "cheap gas" might least be expected, Manchester stands at the head. For the last twelve years its council has steadily resisted all attempts to induce it to "go with the times," and the fact is, we believe, without parallel in the annals of gas lighting, that the Manchester price of gas in 1859 is what it was in 1847—so, at least, it is stated in the local papers, and we are not in a position to question the statement. The profits of the gas-works were found to be a convenient fund for stopping gaps in the municipal budget, and so they might have continued to the present day but for an incautious threat uttered by one of the chief officials of the gas committee, which has directed public attention to the subject, and caused an inquiry of which one of the first fruits is the reduction of 6d. per 1000 feet, carried by a considerable majority at the last meeting of the council. This concession has, however, failed to satisfy the consumers, and, under the pressure of the approaching municipal elections, an organized agitation has been commenced for a further reduction to the Liverpool price of 3s. 9d., with the introduction of the system of letting meters on hire, instead of compelling the consumer to purchase them. In the latter object of the movement we cordially agree, but the first is, we apprehend, premature and unwise, as Liverpool stands in quite an exceptional position, and cannot be fairly quoted as an instance of the rate at which gas can be supplied under ordinary circumstances, as the Liverpool Gas Company has a large amount of non-dividend bearing capital employed in carrying on its operations in the shape of invested profits, and also gains considerably by its meter-making and gas-fitting trade, all of which aid in earning its parliamentary dividend, and thereby in considerably reducing the price of gas. In Liverpool, the fitting trade is principally in the hands of the gas company, whereas in Manchester it gives employment to hundreds of licensed fitters, who would undoubtedly oppose any change in the existing system. We apprehend the true policy of the Manchester public is to try the experiment of 4s. 6d. per 1000 feet for twelve months, and only lower the price till it is found that the earnings of their undertaking exceed the recognized rate of 10 per cent. upon the capital they have invested therein. This is the principle we have uniformly sustained, whether the gas supply of a town has been in the hands of companies or of municipal bodies; and if the gas consumers of Manchester understood their own interest, they would for the present restrict their demands to the adoption of the system of letting meters on hire, the beneficial effect of which is proved by the account we published in our last, from the neighbouring borough of Salford.

## Communicated Articles.

### ON THE VARIABLE COMPOSITION OF THAMES WATER.

By William Odling, Esq., M.B., F.R.S., and Auguste Dupré, Esq., Ph. D.

(*Abstract of a Paper read before the British Association at Aberdeen.*)

The first table illustrates the differences in general character of high and low water at Greenwich during different periods of the year 1857. The figures represent the number of grains of solid matter contained in Imperial gallons of the water:—

| | | *Suspended.* | | | *Dissolved.* | | | *Total.* |
|---|---|---|---|---|---|---|---|---|
| | | Organic. | Mineral. | Total. | Organic. | Mineral. | Total. | |
| March to May, 1857 .. | High | 1·28 | 4·13 | 5·41 | 15·50 ? | 102·03 ? | 117·03 | 122·45 |
| | Low | 1·62 | 7·12 | 8·74 | 5·41 | 22·30 | 27·71 | 36·74 |
| June to September, 1857.. | High | 0·86 | 1·57 | 2·43 | 21·30 | 268·48 | 289·78 | 292·15 |
| | Low | 1·21 | 3·36 | 4·57 | 5·67 | 52·53 | 58·20 | 62·77 |
| October to December, 1857 | High | 0·47 | 2·46 | 2·93 | 7·71 | 121·83 | 129·54 | 132·48 |
| | Low | 1·15 | 2·96 | 4·11 | 3·28 | 27·17 | 30·45 | 34·66 |
| Average of year 1857 .. | High | 0·91 | 2·68 | 3·59 | 15·37 | 172·26 | 187·63 | 191·22 |
| | Low | 1·31 | 4·35 | 5·66 | 4·82 | 35·32 | 40·14 | 45·80 |

The amount of dissolved matter, organic and mineral, is greater in high water than in low water, in consequence of the contamination of the high water with sea-water; and greater in summer than in spring and winter, in consequence of the greater contamination with sea-water in that season, dependent upon the diminished volume of the fresh stream water.

The second table exhibits the results of ten similar weekly experiments upon high and low water, taken further up the river, at Lambeth Palace, during the period July 15 to September 15 of the following year, 1858:—

| | | *Suspended.* | | | *Dissolved.* | | | *Total.* |
|---|---|---|---|---|---|---|---|---|
| | | Organic. | Mineral. | Total. | Organic. | Mineral. | Total. | |
| Lambeth .. .. .. .. | High | 0·75 | 2·17 | 2·92 | 9·93 | 129·50 | 139·43 | 142·35 |
| | Low | 1·47 | 10·37 | 11·84 | 1·95 | 21·37 | 23·32 | 35·16 |

Here also, as at Greenwich, the difference in the amount of dissolved organic and mineral matter contained in high and low water is very striking.

It is interesting to compare the results obtained at Greenwich and Lambeth.

The average amount of residue in high water at Lambeth between July 15 and Sept. 15, 1858, was found to be about half as much as the average residue yielded by the high water at Greenwich during the corresponding period from June 1 to Sept. 29, 1857. Thus:—

| | *Suspended.* | | | *Dissolved.* | | | *Total.* |
|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | Organic. | Mineral. | Total. | |
| Lambeth .. .. .. .. .. | 0·75 | 2·17 | 2·92 | 9·93 | 129·50 | 139·43 | 142·35 |
| Greenwich .. .. .. .. | 0·86 | 1·57 | 2·43 | 21·30 | 268·48 | 289·78 | 292·15 |

Similarly with regard to the low water, thus:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lambeth .. .. .. .. .. | 1·47 | 10·37 | 11·84 | 1·95 | 21·37 | 23·32 | 35·16 |
| Greenwich .. .. .. .. | 1·21 | 3·36 | 4·57 | 5·67 | 52·53 | 58·20 | 62·77 |

The average amount of residue in high water at Lambeth between July 15 and Sept. 15, 1858, was found to be rather more than the average residue of the high water at Greenwich during the spring and winter periods of 1857—March 9 to May 25, and Oct. 5 to Dec. 23 respectively, thus:—

| | *Suspended.* | | | *Dissolved.* | | | *Total.* |
|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | Organic. | Mineral. | Total. | |
| Lambeth, summer .. .. .. | 0·75 | 2·17 | 2·92 | 9·93 | 129·50 | 139·43 | 142·35 |
| Greenwich, spring .. .. .. | 1·28 | 4·13 | 5·41 | 15·50 ? | 102·03 | 117·03 | 122·45 |
| Greenwich, winter .. .. .. | 0·47 | 2·46 | 2·93 | 7·71 | 121·83 | 129·54 | 132·48 |

Similarly with regard to low water, thus:—

| | *Suspended.* | | | | *Dissolved.* | | | | *Total.* |
|---|---|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | | Organic. | Mineral. | Total. | | |
| Lambeth, summer .. .. .. | 1·47 | 10·37 | 11·84 | ..... | 1·95 | 21·37 | 23·32 | ..... | 35·16 |
| Greenwich, spring .. .. .. | 1·62 | 7·12 | 8·74 | ..... | 5·41? | 22·30 | 27·71 | ..... | 36·74 |
| Greenwich, winter .. .. .. | 1·15 | 2·96 | 4·11 | ..... | 3·28 | 27·17 | 30·45 | ..... | 34·66 |

Taking the average of any period, the amount of suspended matter is nearly twice as great at low as at high water, thus:—

| | | *Suspended.* | | |
|---|---|---|---|---|
| | | Organic. | Mineral. | Total. |
| Greenwich, March to May .. .. | High | 1·28 | 4·13 | 5·41 |
| | Low | 1·62 | 7·12 | 8·74 |
| Greenwich, June to September .. | High | 0·86 | 1·57 | 2·43 |
| | Low | 1·21 | 3·36 | 4·57 |
| Greenwich, October to December.. | High | 0·47 | 2·46 | 2·93 |
| | Low | 1·15 | 2·96 | 4·11 |
| Lambeth, July to September .. | High | 0·75 | 2·17 | 2·92 |
| | Low | 1·47 | 10·37 | 11·84 |

The average amount of suspended matter at Lambeth $\left\{\begin{matrix}2{\cdot}92\\11{\cdot}84\end{matrix}\right\}$ 7·38 is higher than at Greenwich $\left\{\begin{matrix}5{\cdot}80\\3{\cdot}59\end{matrix}\right\}$ 4·69.

As a rule, the per centage of organic matter in the total suspended matter is greater at high than at low water:—

| | | Per Centage of Organic Matter in Total Suspended Matter. | |
|---|---|---|---|
| Greenwich, March to May .. .. | High | 23·66 | Mean, 25·04 |
| | Low | 18·53 | |
| Greenwich, June to September .. | High | 35·39 | Mean, 24·32 |
| | Low | 26·45 | |
| Greenwich, October to December.. | High | 16·07 | |
| | Low | 27·98 | |
| Lambeth, July to September .. | High | 25·68 | |
| | Low | 12·41 | |

At high water the per centage of organic matter in the total suspended matter, in corresponding periods, is less at Lambeth than at Greenwich, and at low water only half as much; or, in other words, the muddiness of the river at Lambeth, more particularly at low water, is due chiefly to silt and mineral *débris*.

In the winter and early spring, when the quantity of stream-water is great, the presence of sea-water scarcely makes itself felt in the high water, even at Greenwich; or, in other words, there is very little difference in the saline matter of low and high water; but in dry weather this difference becomes more and more marked, and is noticeable higher and higher up the river:—

| | | *Dissolved Matter.* | | |
|---|---|---|---|---|
| | | Organic. | Mineral. | Total. |
| April 7, 1857—Greenwich .. .. | High | 8·32? | 30·32 | 38·64 |
| | Low | 5·05? | 17·54 | 23·59 |
| April 20, 1857 .. .. .. .. | High | 7·18? | 31·34 | 38·52 |
| | Low | 6·52? | 16·53 | 23·05 |
| Nov. 30, 1857 .. .. .. .. | High | 6·50 | 58·43 | 64·93 |
| | Low | 3·18 | 27·04 | 30·22 |
| Feb. 12, 1858 .. .. .. .. | High | 4·48 | 37·78 | 42·26 |
| | Low | 2·56 | 22·22 | 24·78 |
| March 10, 1858 .. .. .. .. | High | 4·13 | 51·91 | 56·04 |
| | Low | 2·32 | 22·91 | 25·23 |

These are the lowest amounts of dissolved matter we have found in the low water at Greenwich, except upon two occasions after severe rain.

The largest amounts of dissolved matter at Greenwich, and consequently the greatest differences between high and low water, are tabulated below:—

| | | Organic. | Mineral. | Total. |
|---|---|---|---|---|
| July 13, 1857—Greenwich .. .. | High | 23·63 | 319·82 | 343·45 |
| | Low | 8·49 | 52·18 | 60·67 |
| July 20, 1857.. .. .. .. .. | High | 27·53 | 339·47 | 367·00 |
| | Low | 4·81 | 52·46 | 57·37 |
| July 27, 1857.. .. .. .. .. | High | 35·85 | 421·96 | 457·81 |
| | Low | 5·78 | 85·70 | 91·48 |
| Aug. 3, 1857 .. .. .. .. .. | High | 22·22 | 336·76 | 358·98 |
| | Low | 6·07 | 82·99 | 89·06 |
| Aug. 10, 1857.. .. .. .. .. | High | 32·64 | 437·17 | 469·81 |
| | Low | 6·41 | 82·09 | 88·50 |
| Oct. 5, 1857 .. .. .. .. .. | High | 12·24 | 481·66 | 493·90 |
| | Low | 4·48 | 68·29 | 72·77 |
| Aug. 29, 1858.. .. .. .. .. | High | 34·03 | 518·24 | 552·27 |
| | Low | 7·11 | 102·83 | 109·94 |
| Sept. 5, 1858 .. .. .. .. .. | High | 25·61 | 561·88 | 587·49 |
| | Low | 6·12 | 107·55 | 113·67 |

The experiments made at Lambeth have been comparatively few. When the fresh water had already begun to diminish considerably in early summer, we had the following results:—

| | | *Dissolved.* | | |
|---|---|---|---|---|
| | | Organic. | Mineral. | Total. |
| July 16, 1858.. .. .. .. .. | High | 9·28 | 38·96 | 48·24 |
| | Low | 1·93 | 21·58 | 23·51 |

And at the end of the summer the following:—

| | | | | |
|---|---|---|---|---|
| Sept. 8, 1858 .. .. .. .. .. | High | 18·21 | 246·58 | 264·89 |
| | Low | 1·87 | 24·75 | 26·62 |

It is observable that while the amount of saline matter in the high water varied between July 16 and Sept. 15 from 38·96 grains to 246·58 grains per gallon, the amount in the low water varied only from 17·38 grains (the minimum) on July 22, to 26·85 grains (the maximum) on Sept. 15; while out of the ten examinations, in only one—namely, the last—did the amount of dissolved matter vary more than three grains from the average, 21·37.

Early in the present year the existence of sea-water in the river was very perceptible; so much so, that even at Wandsworth a difference between high and low water was observed comparable to that which existed at Greenwich during the winter months. On April 20, 1859, specimens of high and low water were taken at Wandsworth, Battersea Bridge, Lambeth Palace, London Bridge, and Greenwich respectively. In going down the river the amount of dissolved matter in the water and the difference between high and low water underwent marked increase, thus:—

| | *Organic.* | | | *Mineral.* | |
|---|---|---|---|---|---|
| | Low. | High. | | Low. | High. |
| Wandsworth .. .. .. | 1·60 | 2·18 | .... | 18·82 | 28·74 |
| Battersea Bridge .. .. | 1·71 | 2·37 | .... | 19·42 | 40·67 |
| Lambeth Palace .. .. | 1·44 | 5·96 | .... | 19·85 | 57·76 |
| London Bridge .. .. | 2 62 | 7·26 | .... | 20·91 | 134·22 |
| Greenwich .. .. .. | 3·66 | 23·19 | .... | 30·86 | 313·76 |

At low water at Lambeth the amount of dissolved matter, mineral and organic, and the total amount of residue, are greater at the sides than at the middle; or the pure stream-water cuts for itself a central passage through the foul stagnant water at the sides. The table gives the mean results of three consecutive weekly examinations:—

| | *Suspended.* | | | | *Dissolved.* | | | | *Total.* |
|---|---|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | | Organic. | Mineral. | Total. | | |
| Surrey side.. .. .. .. .. | 1·75 | 8·67 | 10·42 | ..... | 4·72 | 54·99 | 59·71 | ..... | 70·13 |
| Middlesex side .. .. .. .. | 2·21 | 7·71 | 9·92 | ..... | 5·57 | 54·89 | 60·46 | ..... | 70·38 |
| Mean of two .. .. .. .. | 1·98 | 8·19 | 10·17 | ..... | 5·14 | 54·94 | 60·08 | ..... | 70·25 |
| Mid-stream.. .. .. .. .. | 3·47 | 5·81 | 9·28 | ..... | 3·19 | 40·90 | 44·09 | ..... | 53·37 |

The amount of suspended organic matter is greater in the middle than at the sides, while the reverse is the case with the suspended mineral matter.

The same action, though in a much less marked degree, takes place at high water. The upcast flow, largely contaminated with sea-water, forces for itself a central passage through the stagnant sides of the river. The amount of dissolved mineral matter and the total amount of residue are greater at the middle than the sides: Here also the table shows the mean results of three consecutive weekly experiments:—

| | *Suspended.* | | | | *Dissolved.* | | | | *Total.* |
|---|---|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | | Organic. | Mineral. | Total. | | |
| Surrey side.. .. .. .. .. | 1·28 | 12·85 | 14·13 | ..... | 10·95 | 125·14 | 136·09 | ..... | 150·22 |
| Middlesex side .. .. .. .. | 1·56 | 19·90 | 21·46 | ..... | 11·72 | 135·48 | 147·20 | ..... | 168·66 |
| Mean of the two .. .. .. | 1·42 | 16·37 | 17·79 | ..... | 11·33 | 130·31 | 141·64 | ..... | 159·43 |
| Mid-stream.. .. .. .. .. | 0·31 | 6·58 | 6·89 | ..... | 11·49 | 157·41 | 168·90 | ..... | 175·79 |

It is observable that the amount of suspended matter, both organic and mineral, is greater at the sides than at the middle.

In comparing the down stream at about two hours before low water, it was found that the amount of dissolved matter increased from Chelsea to London Bridge and thence to Greenwich. Thus we have, as the means of several experiments:—

| | *Suspended.* | | | | *Dissolved.* | | | | *Total.* |
|---|---|---|---|---|---|---|---|---|---|
| | Organic. | Mineral. | Total. | | Organic. | Mineral. | Total. | | |
| Chelsea .. .. .. .. .. | 3·76 | 23·49 | 27·25 | ..... | 3·85 | 23·87 | 27·72 | ..... | 54·97 |
| London Bridge .. .. .. .. | 2·63 | 15·45 | 18·08 | ..... | 2·29 | 31·59 | 33·88 | ..... | 51·96 |
| Greenwich .. .. .. .. .. | 1·39 | 8·37 | 9·76 | ..... | 6·09 | 66·32 | 72·41 | ..... | 82·17 |

The increase in the quantity of dissolved constituents at London Bridge above that at Chelsea does not depend upon the influx of sewerage poured into the river between those two points—for the effect of the sewerage poured into the Thames during any one hour must be quite inappreciable—but to the increasing admixture of the pure stream-water with the stagnant river-water of the previous up tide.

In the early part of the year, when the body of stream-water is large, this admixture is in great measure prevented, and we then notice no appreciable difference in the amount of dissolved matter at Chelsea and London, despite the influx of sewerage:—

| | | *Commercial Dock.* | *Suspended.* | | | *Dissolved.* | | | *Total.* |
|---|---|---|---|---|---|---|---|---|---|
| | | Sp. Gr. | Organic. | Mineral. | Total. | Organic. | Mineral. | Total. | |
| Surface | .. | 1001·76 | 0·00 | 0·95 | 0·95 | 4·40 | 146·26 | 150·66 | 151·61 |
| Bottom | .. | 1002·00 | 0·00 | 8·54 | 8·54 | 6·85 | 167·77 | 174·62 | 183·16 |
| | | *Tunnel.* | | | | | | | |
| Surface | .. | 1001·42 | 0·00 | 0·96 | 0·96 | 6·43 | 105·81 | 112·24 | 113·20 |
| Bottom | .. | 1001·58 | 1·70 | 20·81 | 22·51 | 5·65 | 119·21 | 124·86 | 147·37 |

The effect produced on the character of Thames water by a heavy rainfall is shown most strikingly in the following results, obtained with Thames water at Greenwich in 1857:—

| | *High Water.* | | *Low Water.* | |
|---|---|---|---|---|
| | *Soluble Matter.* | | *Soluble Matter.* | |
| | Organic. | Mineral. | Organic. | Mineral. |
| Oct. 13, 1857 .. | 10·18 | 113·64 | 2·03 | 23·08 |
| Oct. 22, 1857 .. | 16·20 | 218·58 | 2·96 | 32·91 |
| Oct. 27, 1857 .. | 3·20 | 18·84 | 5·01 | 14·01 |
| Nov. 4, 1857 .. | 9·95 | 104·21 | 2·77 | 23·28 |
| Nov. 10, 1857 .. | 3·16 | 26·29 | 3·28 | 20·24 |

On Oct. 22 and Nov. 4 there were spring tides, which always increase the amount of dissolved matter in the river by the greater influx of sea-water.

The total rainfall between Oct. 7 and Oct. 22 amounted to less than half an inch. In the week preceding Oct. 22 the rainfall was 0·19; but on Oct. 22 there occurred an enormous rainfall, amounting to 2·57 inches, or one-tenth part of the average annual rainfall. Mr. Glaishier calculated that on that day 20,000,000 tons, or 84,000,000 hogsheads, of water fell on the London districts.

On Oct. 27, after the lapse of four days and a half, we found that the amount of saline matter per gallon in the low water of the river at Greenwich had been decreased to one half the previous quantity, in consequence of the great dilution effected by the rainfall; but, despite this enormous dilution, the amount of organic matter per gallon had been nearly doubled, probably from the complete scouring of the sewers, inasmuch as the increase of organic matter was not evidenced in water taken high up in the river. The river was thus rendered so full of fresh water, and the sea-water was so thoroughly driven away, that the amount of saline matter in Greenwich high water decreased from 218·5 to 18·8 grains per gallon. On Nov. 4 there was a rainfall of half an inch, which again decreased the amount of saline matter in both high and low water. The full effect of a heavy rainfall upon the river is frequently not attained until one or two days afterwards.

| | *Dissolved.* | | |
|---|---|---|---|
| | Organic. | Mineral. | Total. |
| May 19—Chelsea .. .. .. .. .. | 1·57 | 18·07 | 19·64 |
| London Bridge .. .. .. | 1·56 | 19·51 | 21·07 |
| May 26—Chelsea .. .. .. .. .. | 2·16 | 17·91 | 20·07 |
| London Bridge .. .. .. | 1·82 | 17·71 | 19·53 |

Another point of interest is the difference in composition between the surface water and the deep water. During the flow the sea-water runs up underneath the river-water, and, although complete mixture of the two layers eventually takes place, yet a difference beeween the top and bottom may occasionally be recognized as high up as the Commercial Docks and Thames Tunnel:—

## TRIALS WITH THE PATENT AMERICAN BURNER.

By Andrew Fyfe, Esq., M.D.,
*Professor of Chemistry, King's College University, Aberdeen.*

Results of trials with the patent American gas-burner having lately appeared in several of the Edinburgh newspapers, and in which it is stated that a very great saving of gas is effected, I have been induced to put these burners to the test. The burners were supplied to me from Edinburgh, marked No. 1, 2, 3; they were of different kinds, some much more simple in their construction than others. The first sent consisted of two parts, with a compartment between them, in the upper part of which there was a piece of wire gauze, through the meshes of which the gas passed after escaping from small jets terminating in the lower part of the compartment. From this the gas passed to the burner, from which it escaped and was consumed. The other burners consisted merely of a tube inserted in the socket of the gas-pipe, to which there was attached the burner, the layer of wire gauze being placed between the two. The comparative trials were made with these burners, and with common fish-tail burners, both kinds being marked No. 1, 2, 3. The gas used was that with which Aberdeen was at the time supplied, made from a mixture of Lesmahago and Kinneil cannel coals. The gas consumed by the common fish-tails gave the following results with spermaceti candles consuming 142 grains per hour:—

| | | | | |
|---|---|---|---|---|
| No. 1. | 1·9 | feet gas per hour | = | 5·7 candles. |
| „ 2. | 2·66 | „ „ | = | 7·1 „ |
| „ 3. | 3 | „ „ | = | 7·66 „ |
| | 3 | „ „ | = | 9 „ |
| | 3·1 | „ „ | = | 10·2 „ |
| | 4 | „ „ | = | 10 „ |

With the patent burners and the same gas, the results were—

| | | | | |
|---|---|---|---|---|
| No. 1. | 1·6 | feet gas per hour | = | 6 candles. |
| „ 2. | 2· | „ „ | = | 7·5 „ |
| „ 3. | 2·66 | „ „ | = | 9 „ |
| | 3·27 | „ „ | = | 9·78 „ |
| | 2·5 | „ „ | = | 10 „ |

Thus the common fishtail, No. 1, for each foot of gas consumed, gave the light of 5·7 sperm candles; No. 2, of 7 candles; and No. 3, a light varying in different trials from 7·6 to upwards of 10 candles; while the patent burner gave: No. 1, the light of 6 candles; No. 2, of 7·5; and No. 3, of from 9 to 10 candles. From these trials, then, it appears that nothing is gained by the use of the patent burner, particularly when the burner is such as to consume a large quantity of gas. I think it right, however, to state that, with the patent burner, the gas is not so liable to be wasted as with the burner in common use; with the latter, for instance, when the pressure is great and the stop-cock is fully open, the gas flows out with great velocity, and with a hissing noise, which also occurs when the pressure is increased, as when, during night, a number of the lights are extinguished. This does not occur with the patent burner, the gas uniformly escaping with steadiness, and without the hissing noise; but perhaps some may think this a disadvantage, as the noise gives indication of the useless escape of gas, and consequent expenditure without gain of light.

May we not conclude also from the result of these trials that we have not as yet arrived at the method of uniformly securing the full amount of light that gas will afford by its combustion when properly consumed, especially when simple burners are used? Argands, it is generally allowed, give more light for equal consumptions than simple jets or fishtails, or even than batswings, which consume a large quantity of gas; is it, then, unreasonable to expect that improvements may be made on burners, by which they may be made to yield a greater amount of light than they now do without increasing the quantity of gas consumed? The use of the American burner may, perhaps, do so to a certain extent. I have said that with them there seems to be no waste of gas by too much pressure being employed; the same may be to a certain extent accomplished by attention to the opening of the stop-cock, so as to regulate the supply of gas,—but this would require too much attendance to expect it to be put in practice. The subject is worthy of attention.

# Correspondence.

## COMPENSATING GAS-METERS.

Sir,—In the last number of your Journal I find, at page 539, a letter from Mr. Mead in answer to one of mine, which was, in fact, but a reply to his previous one.

I am very glad to learn, from what he now admits, that we are both quite agreed upon at least two points, viz.—

Firstly, "That the subject of compensating meters is a most important one at the present time," and that he, like myself, "feels convinced, that they can be made to measure more correctly than any other," and that "the question cannot be too carefully investigated."

Secondly, he "quite admits" that I may find his compensating meter now in my possession act as I stated in my former letter—an admission I knew I was entitled to on his part, but I was not prepared for its being so readily made, after reading his former letter to you.

So far we agree. I wish we were brought nearer to perfect unison; but, unfortunately, here our agreement for the present ends; but I hope he will be equally candid, and admit, upon reflection, that I am correct in *all* I state.

Mr. Mead says he "suspects" it is in consequence of my "imi-

tating a very objectionable feature in his meter" that I have got so far on what he "believes" to be the wrong "tack." Now, this is a very remarkable sentence, inasmuch as he only "suspects" in one place, "believes" in another, and condemns his own meter in a third. His conscience evidently will not allow him to assert positively, because he ought to know, that our meter is no more an imitation of his than the sun is an imitation of the moon, with this simple exception, that he has a surplus water reservoir, and so have we, so has Scholefield, and so has Wright—an arrangement for which I and my co-patentee do not claim any originality, and it has not been the subject of a patent by any one in this country, but which, as far as my information goes, Mr. Mead was the first to employ. He still uses it in his latest and most improved meter, and therefore if we are wrong in doing so, so is he, so are also the representatives of the late Mr. Scholefield and those of Mr. Wright. I presume, therefore, this is not what he refers to. I deny any other similarity between the compensating apparatus of his meter and ours but what he has taken from us. He admits that there is a very "objectionable feature" in his meter, with which I quite concur (in fact, in my opinion, there are several); and he suspects if I imitate those "objectionable features" I shall go on the wrong tack. Now Mr. Mead may set his mind perfectly at rest on that point, for I totally disclaim any imitation of his meter beyond the employment of the separate reservoir above alluded to, which is public property in this country; but, on the other hand, I now find him claiming in his patent in 1859 what we clearly described in the specification to our patent in 1856.

Mr. Mead then professes to illustrate what he "believes" to be the evil effects of a rapid supply of water to compensating gas-meters, and in a very guarded way says he had a low-spouted meter "*furnished with a water-box on Mr. Crosley's plan.*" He does not say that he made it himself, or that it was made according to his directions, because he knows that he had no right to manufacture such meters without our licence; but he gives the result of the testing of a meter, which he does not venture to assert was made by my firm, while his remarks are so speciously worded that without careful perusal a person reading the passage inadvertently might be led to believe that it was so. Now, the results he gives of the testings are so very inconsistent with the operations of the meters we are supplying to all our customers, that I take it for granted he is practising a little on the credulity of your readers *; and I therefore now give Mr. Mead this public challenge to come to our works and select from our stock indiscriminately, for the purpose of testing, any finished meter or meters of any size or sizes up to 150 lights (provided we may then have as many in stock as he may wish to try), and I defy him to obtain such results from them (when tested as the Act requires) as he says were obtained from the meter which he had contrived to have "furnished with a water-box." The conditions on my part to this arrangement being that Mr. Mead shall then write a letter to you for publication acknowledging candidly the result of his testing, which shall be performed in the presence of myself and of my assistants.

I will then show him, by one of his own meters, that without tilting, disconnecting, injuring, or marking it in any way, any consumer or other person can abstract water from it to such an extent that it will not register within 11 per cent. of the true quantity consumed, while it will appear from the index to be going on all right, if not at the same time compared with some other suitable measuring instrument. Further, that by simply abstracting more water (a very simple process), gas to supply at least seven or eight 5-feet lights may be obtained through it without a particle of the gas being registered. In neither of these cases, therefore, will his compensating apparatus do its duty.

With regard to his putting 10 lights upon a 3-light meter, though he does not give the rate of consumption per hour, I ask Mr. Mead, as a manufacturer and a practical man, if he considers that number to be the duty of a 3-light meter? I know he can refer to authorities for his so employing it experimentally, and even at a much greater speed, for a purpose, and thereby forcing through such a meter as much as 72 feet per hour, but if the gentlemen I allude to were examined on their oaths as to whether in practice they would either recommend or allow such proceeding, I fancy they would be obliged to acknowledge they would not. Now that there is an Act of Parliament which requires that all meters fixed after the 13th of August next shall be so constructed that there shall only be a tolerated *liability* to error of 2 per cent. fast or 3 per cent. slow, allow me to ask Mr. Mead and those gentlemen, how long will a 3-light non-compensating wet meter made according to such Act continue satisfactorily to supply 10 lights according to Mr. Mead, 50 to 60 feet and even 72 feet per hour according to others, without causing the lights to go out, or becoming pinched for want of water? And how often will the inspectors be required to visit and supply each meter with water? and what increase must be made in the staff of inspectors to accomplish this?

Since I last addressed you, I have obtained from the Patent Office an official copy of Mr. Mead's last patent, the specification of which is dated so recently as the 2nd of last month; and by the drawing attached to it, I see he now proposes to increase his number of joints, hinges, cranks, and working parts,—and consequently to add to the friction,—and to reduce the speed of his elevating apparatus to one lift of the spoon for eleven turns of the upright spindle (instead of one), which, according to the number of teeth in the wheel referred to in my last letter, would now be a drop of water for about 297 revolutions of the measuring-wheel, instead of 27; but in the illustration accompanying the specification, he proposes only one drop for about 396 revolutions of the measuring-wheel, even if the spoon delivers its charge properly. Now let us see what this is practically. Supposing his drawing to represent a meter which indicates a delivery of 5 cubic feet for each revolution of the upright spindle (the most common size), and three 5-feet lights are burning—or say 15 feet per hour—we have 5 feet × 11 teeth in the worm-wheel of the spindle worm = 55 cubic feet consumed for each charge of water raised to compensate for evaporation. Then 15 feet passing through the meter per hour, divided into 55 feet as above, give 3 hours 40 seconds as the time intervening between each discharge of the spoon. This is with three lights on; so that, under those circumstances, you could not hope to get more than one charge delivered during one night's consumption, even in winter, and of course when only one light is used through such meter it will take three times as long. The question is, whether such infinitesimally small doses will be sufficient to compensate for ordinary evaporation, even assuming the spoon to act properly? Possibly I may be wrong, but I think it will not, and in this opinion I am guided by experience.

Let us take another position. Suppose the consumer or any other person has blown down the outlet fittings (a very common practice), and has thereby deranged the water-line by forcing the water from the case into the surplus reservoir or waste water-box below. Our quick lift of water would speedily restore the water-level, but I doubt if Mr. Mead's plan would ever restore it again; and now that I have seen his last *improvement*, I am convinced, by the arrangement he there shows, that he is at least eleven times more in the wrong than I was aware of when I addressed you last. His contrivances appear to me to be an elaborate arrangement to illustrate how *not* to do what the meter professes.

I quite appreciate Mr. F. W. Hartley's decision, as the representative of the late Mr. Wright's firm, not to enter into any controversy, because, as there is such a similarity between his meter and Mead's, I think the old adage will well apply to him, that "discretion is the best part of valour," and, in some cases, "the least said is soonest mended;" but my opinion is, that in a good cause, especially when attacked by others, one ought not to be backward in defending one's self, and, at the same time, promoting the general good to the extent of one's ability. And good must result from public discussions on all the improvements of the day, otherwise what use is there in our engineers', mechanics', and other institutions, and scientific literature, if the members of the former and readers of the latter are not to impart through them knowledge to one another, for the general weal?

WILLIAM CROSLEY.

103, *Southwark Bridge Road, Oct.* 19, 1859.

* P.S. Since writing the above, I have obtained evidence that the meter which Mr. Mead states had been furnished with a water box on my plan, and had been sent to an official meter-tester for trial, was *not* made by my firm, nor was it constructed according to our patent, nor, indeed, *had it any compensating apparatus whatever!* I am at a loss to conceive how Mr. Mead can reconcile his conduct in this matter with veracity or fair dealing.

W. C.

## THE METROPOLITAN GAS SUPPLY.

SIR,—In your recent article, entitled "Programme of the Next Metropolitan Gas Campaign," you have fairly enough stated the broad difference between the Table you published in May last, and that which has recently been issued by direction of the Delegates on Metropolis Gas.

You show on a certain supposition which you make, that the much oppressed London Gas Companies are actually underpaid to the extent of more than £32,000 per annum, for the gas which they supply to the public lamps.

The Table prepared by me for the delegates shows, on the other hand, that the local authorities of the metropolis are paying an overcharge for public lighting of more than £50,000 a year.

Now your supposition is the very charitable and satisfactory one that all the public contracts are scrupulously performed, and that all the public lamps burn throughout the night the exact contract quantity of *five feet an hour*, and are most religiously lighted from sunset to sunrise throughout the year.

For the sake of simplifying the question, I also at present admit the latter, but am widely at issue with you on the former point, namely, as to the consumption of the contract quantity per hour.

I have stated my reasons for assuming that the lamps which consume common gas burn only 16,000 feet per annum instead of 21,520 feet, which they ought to consume at the contract rate of 5 feet an hour.

I have experimented by the best known methods—by methods to which, I believe, no gas engineer can conscientiously object—on the consumption of the gas supplied to public lamps by no less than six of the London companies in nine of the metropolitan parishes.

I found, with one single exception, that the public lamps nowhere consumed anything like 5 feet an hour even on the average; that nowhere, with one exception, did they consume so much as

20,000 feet per annum; and that in one case the consumption was as low as 10,200 feet.

In the exceptional case, where a consumption of 25,000 feet was found, the enormous prices of £5. 12s. and £6. 12s. were charged for the lamps. However, the average of all the experiments gave 16,000 feet as the mean consumption; and I see no reason to believe that it is more at the present time throughout the metropolis.

The next question in which we are at issue relates to the price which should be charged to the local authority as compared with that which the private consumer pays.

I am not aware whether you are right or wrong in stating the opinions of those whom, with questionable taste, you term two principal apostles of the gas movement.

I know, however, that such a distinction prevails generally throughout Great Britain and America, which has followed so closely in the steps of this country by establishing gas-works in every town of the smallest importance. I also know that in many very important towns throughout Great Britain it is the custom to allow very large discounts, ranging in some cases as high as 30 per cent. to large consumers. I know that many of the London gas companies actually at the present time allow large discounts to railway companies, and I am at a loss to know why the local authorities, who are certainly among the very largest class of consumers, are not to be allowed similar discounts.

Is the public to have no compensation for the power which the companies possess to break up their streets, and the perpetual nuisance and injury inflicted on all the inhabitants, whether locomotive or stationary?

Is a consumer who pays a company some thousands a year with absolute certainty and regularity, whereby the company is saved all the risk of bad debts and all trouble of collecting, to have no allowance made to him under these circumstances? I know not how it may work in the case of a monopoly; but where free competition exists, I am sure such a customer will reap, and fairly reap, the advantage of such a position.

The writer of your articles observes truly that £50,000 a year is a princely revenue. So is £32,000, or the sum which, according to you, the gas companies are liberally presenting annually to the ratepayers of the metropolis.

What meritorious individuals the London lamplighters must be to confer this large boon on the metropolis, because to them we are indebted for the faithful performance of the lighting contracts. Theirs is the powerful arm which sways the supply of light to our streets, courts, and alleys. It is entirely in their power to give or withhold, and according as they turn on the taps of their lamps, so will the light be greater or less.

The public little dreams how much it is indebted to the lamplighter, who represents the great company itself, dealing out the supply with a too liberal hand.

Entirely irresponsible to the public is the lamplighter. By a glance of his eye he satisfies himself that he has doled out the proper quantity of gas, and away he goes, never dreaming that in the small hours of the morning when the pressure is taken off at the works, down goes his light, becoming smaller and smaller, and beautifully less, till instead of burning 5 feet an hour it passes through, as was often ascertained by experiment, only 1¼ feet of gas per hour.

I suppose, Mr. Editor, the gas companies wish to be characterized for ever by this vast amount of liberality, and this is probably why they insist on being lamplighters as well as traders in gas, and why they direct that highly independent and trustworthy body of men, the lamplighters, who act as their deputies in lighting the lamps, to give the public such a liberal supply.

But, suppose the public are suspicious of this liberality and do not believe in the 5 feet an hour—will the gas companies, to set this question at rest, supply the gas by meter? No, they prefer undertaking the onerous duties of lamplighter, and, according to the showing of your leading article, make the public a present of £32,000 a year.

By-the-bye, Mr. Editor, will you allow me to ask, with the greatest submission, how it is that no allusion is made to the cannel gas-lamps either in your last dashing article, entitled "Programme, &c.," or in that pains-taking Table in which the price of gas is so laboriously calculated on the 5 feet an hour principle?

The contracts for cannel gas are for 2½ feet an hour; can you show, even supposing this quantity to be given, that the companies make any present to the public in supplying cannel gas? A lamp burning cannel gas for the whole year will consume by contract 4304 × 2½=10,760 cubic feet, which at 6s. per 1000 is equal to .. .. .. .. .. .. .. .. .. .. £3 4 7
Add lighting, extinguishing, cleaning, &c. &c. .. 13 0

Total .. .. .. .. .. .. .. £3 17 7

How many of the 3375 cannel lamps in the metropolis are supplied at this rate?

This reminds me of another curious and striking instance of the blessed results now gradually oozing out in consequence of the monopoly established by the gas companies.

The Chartered Gas Company, which lights more than 800 lamps in Westminster, relieved from all dread of competition, has recently given notice to determine its lighting contract at Christmas.

The district board, as behoves a poor customer in the position of a suppliant seeking a favour, humbly requested to know what it was this high and mighty monopolist company objected to in the present lighting contract. Amongst other objections raised by the company was this, that whereas the local authority had hitherto stipulated for a fixed quantity of gas per hour—namely, 2½ feet—the gas company having now secured the monopoly, thought this might be dispensed with. They consequently refuse to make any stipulation whatever as to quantity, but will only be bound to give a light of ten candles in each public lamp.

No one can be surprised for a moment at such a proposition who has watched the circumstances of the "districting," and the consequent monopoly it has produced.

The only surprise is that this very innocent proposition was made so early, and at a time when public attention is so keenly alive to the subject.

Of course the gas company knows very well that the light of a street lamp can never be tested as burning in the street, and that it would evidently be almost impossible under any circumstances to prove that a contract for a light equal to so many candles was not complied with.

But mark the further stages of this most unreasonable proposition.

I need not tell you, Mr. Editor, that of cannel gas with an illuminating power of 25 candles, which is about the present quality, it will only require 2 feet an hour to give a light of 10 candles.

For this the company proposes to charge 85s. per annum.

Let us analyze this price of .. .. 85s. 0d.
Less lighting, extinguishing, &c. .. 13 0

Leaving .. .. 72 0

for which the company will have to supply 4304 × 2=8608—say 9000 feet of gas, which, at this rate, amounts to exactly 8s. per 1000 feet, or absolutely 2s. more than the private consumer pays.

This is rather a bold stride of the monopolist thus to raise the price to the local authorities absolutely 33 per cent. in excess of that paid by the private consumer.

At present the company charges 87s. 6d. for 2½ feet an hour, which is equivalent to 7s. per 1000 feet, so that the present modest proposal is an increase of 1s. per 1000 feet for all the gas consumed by public lamps.

In addition to this very considerable rise in the price to be paid for the public lamps, the company proposes that the Board of Works shall summarily give up the powers conferred upon it by the 109th section of the Metropolis Local Management Act, and that the company shall have power to break up streets whenever they choose without consent of the board, but simply on giving three days' notice.

They also object to nearly all the penalties for defect of lighting, to which they have hitherto been subjected, and to which they submitted without a murmur in the days of competition. Such are the proposals of the Chartered Company in Westminster. I now go to St. Martin's-in-the-Fields, where the vestry has been compelled to enter into one of the most extraordinary contracts ever heard of. If I am correctly informed, the vestry has consented to waive the power conferred on them by the 109th section of the Act already mentioned, so that the company has unlimited power to break up the streets whenever they please. In addition to this the company only stipulates to give a light equal to 8 *parliamentary candles*. Now, as there is no such thing in existence as a parliamentary candle, there is free scope here for the ingenuity of legal gentlemen to determine what it means.

Both sperm candles and wax are named as standards of light in various Acts of Parliament, and of course the company will contend that the wax candle is the one which is meant by the term *parliamentary candle*. According to this interpretation the company will be able to give the light of 8 wax candles, with something less than 3 feet of gas an hour; and as their former contract was for 4 feet, the parish is thus compelled to take 1-4th less, which is equivalent to an increase in the cost of lighting of 33 per cent.

But probably the most extravagant contract of all is that which the London Company is now proposing in the parish of Chelsea.

They require, as other companies do, the power to break up streets whenever they please; they require the vestry to do the repairs to all the lamps, posts, &c.; they propose a reduction of all the penalties to most absurdly small amounts; and in addition to all this, they propose to light from three quarters of an hour after sunset to three quarters of an hour before sunrise. For these diminished services they propose just the same price as at present, namely, £4. 10s. per lamp, whereas it is clear the price should be .. .. .. .. .. .. .. .. .. .. £4 10 0
less 1-8th of the price of gas alone for short lighting .. .. .. .. .. .. .. 9s. 4d.
Less for repairs .. .. .. .. .. .. 2 0
11 4

Price which should be charged .. .. £3 18 8

But the most monstrous proposition is yet to come. The lamps are each to burn 5 feet an hour; but how is this to be computed? I quote from the words of the proposed contract—"each burner consuming on an average, taking such average from the whole number of burners, and during the whole time of lighting, at the rate of 5 cubic feet of gas per hour at the least." So that according to this provision the vestry would have no right to complain, and could never prove inadequate consumption, unless they absolutely went to the expense of trying all the lamps in the parish throughout the whole year. As this is quite impossible, it is evident the company may give just as little gas as they please, while no violation of the contract could ever be proved against them.

Such are the effects of the monopoly which are now being experienced on all sides, and it seems to be high time that the vestries and district boards should now shake off such a system and burn their gas by meter like the private consumer.

You say, Mr. Editor, in glaring contradiction to my assertions, that "in towns where the price paid for gas supplied to the street lamps is the lowest, the price charged to private consumers is proportionately high." To prove this you select the following.

| | Price for gas in Public Lamps. s. d. | Price to the Private Consumer. s. d. |
|---|---|---|
| Bilston .. .. .. | 3 10 | 5 6 |
| Cambridge .. .. | 3 3½ | 5 6 |
| Dover .. 2s. 6d. and | 1 10 | 5 10 |

You forget to add the additional information which the Table affords that the price in Bilston to large consumers is only 4s. 6d.; that the price in Cambridge, notwithstanding the low price of the public lighting, was actually reduced to private consumers at Lady Day last, to 5s.; and that in Dover discounts of 20 per cent. are allowed to large consumers.

But, independently of these facts which you have omitted to notice, I contend that there is nothing whatever in your argument, unless you could show that the price to the private consumer had risen in proportion as the price for public lighting was lowered. The very reverse of this has taken place in Cambridge, one of the towns you have selected to illustrate your argument.

But, granting for a moment there may be many towns where the price for public lighting is very low, and that to the private consumer somewhat high, does it follow that the one is a consequence of the other?

By no means. The income from public lighting being only about a sixth of that derived from private consumption, it follows that 6d. per 1000 in the public lighting would be balanced by 1d. in the private consumption. How, then, could the extreme difference which you show between the charges for public and private lighting, be caused by the low price of the former?

Allow me, in conclusion, to mention a few towns where the price of both public and private lighting is extremely low, and which, if they prove anything, prove the exact contrary of what you have attempted to show:—

| | Price for Gas in Public Lamps. | Price to Private Consumers. |
|---|---|---|
| Bath .. .. .. .. | 3s. 0d. | 4s. 6d. |
| Belfast .. .. .. .. | 2 5 | 4 2*a* |
| Birmingham .. .. .. | 2 11 | 4 0*a* |
| Blackburn .. .. .. | 3 4 | 4 0 |
| Cardiff .. .. .. .. | 3 3¼ | 4 3*a* |
| Carlisle .. .. .. .. | 2 1 | 4 2 |
| Coventry .. .. .. | 2 2¼ | 4 6 |
| Halifax .. .. .. .. | 1 5¾ | 4 0 |
| Huddersfield .. .. .. | 2 7 | 4 0 |
| Hull .. .. .. .. | 2 11⅕ | 4 6 |
| Macclesfield .. .. .. | 3 3⅕ | 4 6 |
| Sunderland .. .. .. | 3 0⅖ | 4 0 |
| Whitehaven .. .. .. | 1 8 | 2 6 |

*a* With discounts.

SAMUEL HUGHES.

*No.* 14, *Park Street, Westminster, Oct.* 24, 1859.

## LEAKAGE AND FUEL ACCOUNTS.

SIR,—Now that the subjects of leakage and fuel accounts are being discussed, will you allow me a small space in your JOURNAL to compare notes with your correspondents?

In the year ending at Midsummer last we used 1634 tons of coal—none of it was Newcastle—but more than half of it screenings or small from inland collieries, and requiring considerable more fuel for carbonizing than Newcastle; while the coke produced was inferior in quality and wasteful in the furnaces by reason of its great tendency to run to clinker.

| | Feet. |
|---|---|
| Gas made per station-meter . . . . . | 15,745,500 |
| „ supplied to 272 lamps . . . . . 3,941,500 | |
| „ sold by 650 meters . . . . . 9,787,500 | |
| | 13,729,000 |
| Loss, including the gas used on the works, superintendent's house, office, &c. . . . . | 2,016,500 |
| Or . . . . . | 12·81 per cent. |
| Gas sold for each ton of coals used . . . . . | 8,400 feet. |

The length of our mains is about twelve miles with 960 services. If the coals cost 16s. per ton, and the gas was sold at 4s. per 1000 feet, the return would be 42s. gas rental for every 20s. expended for coal.

The quantity of coke used for fuel was 460 chaldrons or 28·15 per cent. of the coke made, reckoning each ton of coal to produce one chaldron of coke; but, as I cannot obtain for tar more than 7s. 6d. per ton of 200 gallons, I use most of it as fuel in addition to the coke; and, allowing 10 gallons of tar as the produce of each ton of coal, and deducting the quantity sold from what is produced, it would leave seventy-six tons used as fuel; and, taking each ton as being of the same commercial value as one chaldron of coke, the per centage for fuel would then be 31·25; or, taking the tar at the same value as the coke, weight for weight, the per centage of the coke and tar, used as fuel, on the quantity produced of both, would then be 32·95.

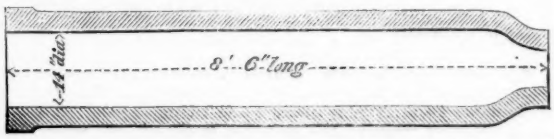
75 per cent. of the coals were carbonized in clay retorts and without an exhauster.

If any of your numerous readers can show me how to obtain better results from the same materials and quantities, I shall feel much obliged by their recording it in your columns.

*October* 14, 1859. C. D.

## OPEN-ENDED RETORTS.

SIR,—Thinking that the accompanying sketch and description of a retort may be of use to some of the readers of the JOURNAL, I have taken the liberty of troubling you with it. If you think it so, please insert it in an early number.




Its only peculiarity consists in its being tapered down, and having a hole 6 inches in diameter through the back end. On this end is fitted a socket mouthpiece, only 3 inches long, to be closed with a lid and screwed bar in the ordinary way. The opening is found to give great facilities for mending the retort when necessary, and is also used with effect to keep down the carbon, which is apt to accumulate on the inside of some retorts. By unscrewing the lids, and allowing a current of air to rush through the retort, we are enabled materially to reduce the time required to scurf or burn off the carbon at the end of the season. Retorts made on this plan can only be used in those works where there is free access to the back of the bench; but the plan is well worth a trial wherever there is a possibility of introducing them.

JAMES ROBB.

*Haddington, October* 16, 1859.

## FEVER IN HOLLAND.

SIR,—I have this day received a letter from a friend in Harlingen, the manager of the gas-works of that town, who is also one of your subscribers, in which he gives a very sad account of the sanitary state of the whole of Holland, but especially of Friesland.

My friend, M. Geijkema, informs me that the ague and typhoid fevers rage so violently at Leuewarden, that the mortality has been raised from the normal rate of from 12 to 16 per week, to not less than from 45 to 50, on a population of about 24,600; or, in order to adopt our usual mode of calculation in England, from a normal rate ranging from 25 to 34 per 1000 per annum, to that of from about 95 to 106 per 1000. At Harlaem, so many of the cavalry soldiers have been invalided, that the authorities have been compelled to send 200 horses to the Hague, because there were no men able to take care of them. M. Geijkema adds that the company which is usually detached from Leuewarden garrison, Harlingen, and which normally consists of from 60 to 70 soldiers, 8 to 10 non-commissioned, and 3 commissioned officers, had been recalled to head-quarters in order to fill up the vacancies occasioned by the fevers, but that, on the day of marching, the supposed valid company could only muster—

1 officer; the others ill.
8 non-commissioned officers.
7 soldiers.

All the rest were in the hospital.

From my own personal knowledge of Holland, I most distinctly assert that the bulk of this sickness is preventible, and that the Governmental and municipal authorities are culpably remiss in the discharge of their duties. We hear of cholera at Rotterdam, and at Amsterdam, at the same time that we hear this sad tale of the ague and fever. Both classes of diseases are mainly attributable to the same causes—viz.: the bad drainage of the country, and the repulsive filthiness of the towns; and as the modes of dealing with both those sources of evil is perfectly well understood by other nations, if not by the Dutch themselves, it really seems to me that the authorities of that country incur a grave moral responsibility by allowing the prolonged existence of causes of preventible disease of so fearful a character.

GEO. R. BURNELL.

14, *Lincoln's Inn Fields, Oct.* 24, 1859.

# Register of New Patents.

853.—George Frederick Chantrell, of Liverpool, furnace engineer, and Edward Dutch, of the same place, for "*Improvements in the apparatus for regulating the quantity of water to be used for the flushing of water-closets and other purposes.*" Patent dated April 5, 1859.

This invention consists in certain self-acting arrangements for controlling the supply of water to be used for water-closets, urinals, wash-basins, and other like purposes, by regulating the amount of water used each time the apparatus is brought into play. It consists in the use of a water supply-cistern, which is provided with a double bottom, forming a measuring-chamber, to contain the quantity of water required at each operation of the apparatus; or the double bottom may be dispensed with by connecting a vessel of the required capacity to the under side of the supply-cistern. In either case a double-acting valve is used, which is placed within the measuring-chamber, and which, upon being lifted or depressed, as the case may be, cuts off the supply opening between the cistern and the measuring-chamber, and opens the discharge orifice formed in the bottom of the measuring-box; and, upon the action being reversed, the supply-valve is opened and the discharge orifice closed. This double valve is acted upon by a system of rods, levers, &c., which receive their motion through the seat of the closet, or a platform in front of the closet, urinal, wash-basin, or other receptacle in which the water is received for use, by being acted upon by the weight of the person using them, or they may be so arranged as to be acted upon by the hand.

When the supply-cistern is fed from a high-pressure main, the feed-pipe is provided with an internal valve, which opens upwards; the valve shank is connected to one end of a lever of the first order, and to which a float is attached at the other end which acts as a weight to keep the valve open when not immersed in the water; but, when the water in the cistern has risen sufficiently high to act upon the float, it closes the valve.

The measuring-chamber is provided with a fixed air-pipe, which extends to the high-water level of the supply-cistern, and which will form an overflow-pipe for the water in case the supply-valve should get out of order; or a hollow rod may be used to form the air-passage, with side openings formed at the high-water level, and which also acts as an overflow-pipe by making a side opening or openings communicating therewith in the valve-cover at a point between its upper and lower surfaces.

It is preferred to construct the supply-cistern of glazed stoneware such as is now in common use for the manufacture of sanitary drain-pipes, &c. The lower end of the cistern is formed with one or more internal rims or flanges, to which the upper and lower bottoms are bedded, and which forms a chamber of the required capacity.

In the upper or lower bottom, as may be found most convenient, a flange is fitted, which forms the upper or lower valve-seat, as the case may be, and which is held in position by a second nut on the ends of the bolts which secure the bottoms to the internal flange or flanges, and which can be removed to facilitate any necessary repairs of the valve.

But the supply-cistern may be made of any suitable material, and of a round, square, or other convenient shape. It will also be readily seen that in some cases the supply-cistern and float-valve may be done away with by connecting the measuring-chamber directly with the street main.

The claims are for—

1. The construction of cisterns with double bottoms substantially in the manner and for the purposes described, or any mere modification of the same.

2. The use of the double-acting valve hereinbefore described, or any mere modification of the same, when applied to double-bottomed cisterns or measuring-boxes, substantially and in the manner, and for the purposes hereinbefore set forth and described.

3. The peculiar mode of constructing cisterns from an earthenware pipe or tube, having an internal annular flanch or flanches to receive an upper and lower bottom of slate or earthenware, as described, or any mere modification of the same.

4. The peculiar combination and arrangement of the various parts of the apparatus hereinbefore described, when applied for regulating the flow of water.

878.—Marc Antoine François Mennons, of 39, Rue de l'Échiquier, Paris, for "*An improved articulated joint for water, gas, and steam pipes.*" A communication. Patent dated April 8, 1859.

This invention consists in an improved system of articulation applicable to the joints of water, gas, and steam pipes or mains.

The drawing attached to the specification represents the simplest form of this arrangement. It consists of one pipe, with a circular chamber at its extremity, and a second with a spherical extremity corresponding with the chamber. The spherical extremity of the second pipe being fitted into the circular chamber of the first; the whole is secured by a pledget, formed of lead, caoutchouc, or other suitable matter, which, while effectually maintaining the spherical extremity of the second pipe in connexion with the corresponding part of the first pipe, permits of either being inclined to a certain extent without interfering with its working power. It is evident that by combining a number of these articulations, any required curve or inclination may be given to the pipes laid down, thus avoiding the formation of the fixed joint with acute angles now generally employed.

This arrangement may, to some extent, be altered in practice according to the requirements of the locality or position in which the pipes are laid, and the kind of work for which they are intended; but for all ordinary purposes it will be found amply sufficient in its present form.

The claim is for the formation of articulated or movable joints, as described and shown in the drawing, and their application to water, gas, and steam pipes or mains of any dimensions.

897.—Robert Brown, of 5, St. Paul's Churchyard, in the City of London, for "*Improvements in stoves and apparatus for warming and ventilating apartments and buildings.*" Provisional protection only obtained. Dated April 9, 1859.

This stove is made of metal or earthenware, or both combined, and is formed to burn either gas or ordinary fuel. It is constructed so as to admit into a compartment or chamber fresh air from the external atmosphere, and to warm it by contact with the heating surfaces hereinafter described, and to pass it warmed into the apartment or building to be warmed and ventilated.

Ventilation is effected by withdrawing the air rendered impure or unpleasant by respiration, tobacco smoke, or other contamination, from the upper stratum of the air of the apartment, down tubes or channels passing through the stove or down the wall, the mouths of such tubes or channels opening near to the ceiling, their lower ends being carried down into, or around, or in contact with the exterior of the channel through which the fresh cool air enters, and which fresh air, by reason of such contact, imbibes a portion of the warmth of the descending column of impure air, the rapidity of the current of such descending impure air being increased by the condensation thus produced in it. The lower end of the tube or channel is then turned up a passage in the stove leading to the flue, which it there surrounds or enters, and then passes into the chimney.

Combustion of the gas or fuel is sustained by air withdrawn from near to the floor through openings under or beneath the door, or through the interstices between the panes of glass therein, or it may be taken into the combustion-chamber from under some part of the floor of the apartment. A glass door or screen enclosing the fire is used to avoid accidents from fire and to prevent dust from the fire entering the apartment or building.

To impart the cheerful aspect of a fire, the entrance into the combustion-chamber is surrounded wholly by silvered glass or other reflecting medium, so arranged as to multiply the appearance of the fire by reflection. The fire is fed through the door, or side, or top of the stove.

To increase the amount of impure air withdrawn, an aperture is made from the apartment through the lowest part of the entrance into the chimney, and may be regulated by any ordinary contrivance.

The heating surfaces hereinbefore referred to are made of metal or burnt clay, and consist of cells or chambers placed above the gas or fire, open at the bottom, and into which the heat rises as it is evolved and cast off by the gas or fire, and out of which it cannot escape without parting with a large amount of its caloric, of which more and more is absorbed by the surrounding tubes and sides of the different cells and chambers into which the heated products of combustion flow in succession until they reach the flue.

The enclosed chamber about and around the heating surfaces into which the fresh air enters is called the heating-chamber, and it has obstructive projections at different parts to deflect and direct the current of fresh air against the heating surfaces, which, being well supplied with a continuous current of fresh air again, do not become so hot as to decompose the air or to singe the particles of dust or organic matters floating in the air.

912.—Patrick Aitchison, Sheffield, brassfounder, for "*Improvements in taps.*" Patent dated April 12, 1859.

In these improved taps the valve is made of leather or other material encased in brass or other metallic substance, and the valve-seat is constructed with a projecting rim concentric with the circumference of the orifice therein. The valve is attached to the key-spindle or plug, which works in a screw-collar, and closes the valve by the projecting seat, or removes it therefrom according to the motion imparted to it. The pressure of the water, which ordinarily causes vibration of the valve when opened and intermittent action, is regulated where the supply-pipe is attached by the diameter of the inlet orifice of the tap. Taps of this construction are applicable for ball and bib-taps, street fountains, fire plugs, and general purposes.

The claim is for—

1. The projecting seat.
2. The peculiar construction of valve with encased joint.
3. The adaptation of the diameter of the inlet orifice to the pressure of the water.

966.—John Moule, of Seabright Place, Hackney Road, London, for "*A new compound liquid for illuminating purposes.*" Provisional protection only obtained. Dated April 16, 1859,

This invention consists in mixing alcohol with turpentine or other hydrocarbons so as to form a liquid suitable for illuminating purposes.

The following are the average proportions of the ingredients composing the above-named liquid:—To pure or methylated alcohol add one part of pyroligneous wood spirit, so that when mixed they are of the specific gravity of about 820 at a temperature of about 60°; add 3 parts of rectified spirits of turpentine to 16 parts of the before-mentioned alcoholic mixture. If a larger quantity of spirits of turpentine is required, then add about 1 part of pure benzole, distillates of coal tar, or other hydrocarbons, to 16 parts of the above alcoholic mixture. This will enable a larger quantity of turpentine to mix with the alcohol and modify the character of the flame.

969.—William Prosser, of 24, Dorset Place, Dorset Square, London, gentleman, for "*Improvements in apparatus employed in the production of light.*" Provisional protection only obtained. Dated April 18, 1859.

This invention refers to apparatus employed in the production of light by the combustion of oxygen and hydrogen or carburetted hydrogen gases or lime, or other suitable material, and consists in so arranging and securing the lime or other material in a metallic or other suitable case or frame, parts of which are cut away where necessary, to expose the lime to the action of the jet or jets of flame, by which, in convenient pieces, it is ordinarily held together and moved as one piece, thus preventing the separation of the pieces should they become cracked by the action of the flame or otherwise, and avoiding the displacement which is consequent sometimes upon the friction of the lime against the interior surfaces of the metal or other grinding case or guard in which it is enclosed and through which it is progressively moved to and from the jet or jets of flame, and thereby more completely conducing to the continuity of the light.

970.—George Porter, of the City of London, smith and gas-fitter, for "*Improvements in valves and cocks.*" Provisional protection only obtained. Dated April 18, 1859.

These improvements relate to the construction of valves or cocks for stopping or regulating the flow of fluids either hot or cold. This cock is formed in two halves—the inlet end and outlet—which are bolted or screwed together with an interposed plate, in which there is an opening corresponding to the water-way through the cock. At the back of this interposed plate there is a sliding valve, which, being moved up or down, opens or closes the water passage. A pin affixed to the sliding valve takes into a vertical sliding rod, to which motion may be given by means of a lever, screw, or other convenient method. The pressure of the fluid behind the sliding valve keeps it in close contact with the face-plate, while a very small amount of force suffices to move the valve, and open or close the passage. In the event of wear or accidental injury, the interposed plate and sliding valve can be easily and cheaply replaced, when the cock is as good as at first, the main body of the cock never requiring to be renewed. In a ball-cock, the end of the ball lever takes into and moves the sliding rod and valve. Instead of permanently affixing the float or ball to the end of the lever, as is usually done, the ball slides upon a vertical rod with a set screw for fixing it at a suitable elevation to regulate the water-level in the cistern. This vertical rod has an eye, which slides upon the horizontal arm of the lever with a set screw for regulating the leverage of the ball.

## PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

2177.—DAVID WHITE, of 18, High Holborn, London, gas-fitter and engineer, for "*Increasing the illuminating and heating power of gases, and regulating the flow of gases, and improvement in the material for gas-meters, and improvement in glass and cylinder holders.*" Sept. 26, 1859.

2190.—WILLIAM COLLINS, of Salford, Lancaster, engineer and brass-founder, for "*Improvements in stand-pipes for hydrants.*" Sept. 28, 1859.

2194.—EDMUND SMALL CATHELS and SAMUEL SPLATT, both of Dover, in the co. of Kent, for "*Improvements in gas-meters.*" Sept 28, 1859.

2211.—JAMES WADSWORTH, of Manchester, gas engineer, for "*Improvements in instruments or apparatus for measuring the quantity, for regulating the pressure, and for controlling the flow or passage of gas used for purposes of illumination, and in the construction of gas-burners.*" Sept. 30, 1859.

2219.—HERBERT WILLIAM HART, of Fleet Street, London, gas engineer, for "*Improvements in argand and other gas-burners, partly applicable to oil and other lamps.*" Sept. 30, 1859.

2231.—JOHN MILLAR, of Edinburgh, N.B., glass merchant, for "*Improvements in reflectors for diffusing artificial light.*" Oct. 1, 1859.

## NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

1510.—ALEXIS JEAN DESSALES, of 13, Rue des Enfans Rouges, Paris, for "*An improvement in the working and securing of sliding tubes applicable to gas chandeliers, lamps, and other purposes.*" June 23, 1859.

1551.—JOHN JOSEPH GRIFFIN, of 119 and 120, Bunhill Row, London, for "*Improvements in gas furnaces, suitable for fusing refractory metals.*" June 29, 1859.

1699.—FREDERICK COLLIER BAKEWELL, of 6, Haverstock Terrace, Hampstead, in the co. of Middlesex, for "*Improvements in extracting oils from coal and other minerals.*" A communication. July 19, 1859.

1981.—ROBERT BEVERLEY, of Leeds, in the co. of York, gas-meter maker, for "*Improvements in wet gas-meters.*" Aug. 31, 1859.

2157.—JOHN DALES, of 11 and 12, Gresham House, Old Broad Street, London, for "*Improvements in purifying sewerage and other impure waters, and in separating therefrom materials suitable for use as manure, and also the preparation of a substance to be employed for such purposes.*" Sept. 22, 1859.

2211.—JAMES WADSWORTH, of Manchester, gas engineer, for "*Improvements in instruments or apparatus for measuring the quantity, for regulating the pressure, and for controlling the flow or passage of gas used for purposes of illumination, and in the construction of gas-burners.*" Sept. 30, 1859.

## LIST OF PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1607.—ROBERT MARTINEAU and BROOKE SMITH, "*Improvements in taps for drawing off liquids.*" July 8, 1856.

1665.—JOHN HENRY JOHNSON, "*Improvements in apparatus for consuming smoke, to be applied to lamps and gas-burners.*" July 15, 1856.

1712.—RICHARD ARCHIBALD BROOMAN, "*An improved method of supplying air to gas and other lights.*" July 19, 1856.

1732.—CHARLES COWPER, "*Improvements in lighting and extinguishing gaslights.*" July 22, 1856.

1783.—HENRY REMINGTON, "*An improved gas heating and cooking apparatus.*" July 26, 1856.

1794.—WILLIAM EDWARD NEWTON, "*Certain improvements in the process of generating illuminating gas.*" July 29, 1859.

1815.—THOMAS WICKSTEED, "*Improvements in separating sewerage and other matters from water or fluid mixed therewith.*" July 31, 1856.

1826.—WILLIAM FRANKLIN SHAW, "*An improved burner or apparatus for the combustion of air and inflammable gas.*" Aug. 1, 1856.

1835.—CHARLES THÉODULE LAUNAY and JULES CHOPIN, "*Improvements in increasing the illuminating power of gas.*" Aug. 4, 1856.

1837.—THOMAS BARNABAS DAFT, "*Improvements in the manufacture of cast-iron pipes.*" Aug. 4, 1856.

1838.—ALEXANDER WRIGHT, "*Improvements in lighting mines and subterranean places with gas.*" Aug. 4, 1856.

1882.—EDWARD OWEN, "*Improvements in the manufacture of gas, and in the obtainment of products arising in such manufacture.*" Aug. 9, 1856.

1883.—GEORGE ANDERSON, "*Improvements in the construction of taps or valves for regulating the passage of gas.*" Aug. 9, 1856.

1969.—WILLIAM RACSTER, "*Improvements in apparatus for regulating the supply of gas.*" Aug. 23, 1856.

2009.—JEAN BAPTISTE FEAUVEAU and LOUIS ALEXANDRE LEGRAND, "*An improved apparatus for the purification and the combustion of gas.*" Aug. 26, 1856.

2160.—ROBERT ELMY GARROOD, "*Improvements in stop-cocks and valves for the drawing off and passage of air, gas, steam, water, and other fluids, or for any other purpose for which the same may be applicable.*" Sept. 16, 1856.

2166—RICHARD ARCHIBALD BROOMAN, "*Improvements in water-closets and night-stools.*" Sept. 16, 1856.

2196.—CHARLES FREDERICK VASSEROT, "*Improvements in filtering water on a large scale.*"

2242.—ROBERT BROWN, "*Improvements in taps or valves.*" Sept. 25, 1856.

2263.—GEORGE NEALL, "*An improved union gas-stove for lighting and heating.*" Sept. 27, 1856.

# Legal Intelligence.

## COURT OF BANKRUPTCY.

THURSDAY, OCT. 20.

(*Before Mr. Commissioner* FANE.)

RE E. AND A. PRIOR.

Mr. LINKLATER, for the bankrupts, applied that they might pass their last examination.

The COMMISSIONER inquired whether any creditor opposed.

Mr. LINKLATER said he believed not, as no notice of an intention to do so had been served.

The COMMISSIONER read over the items of the balance-sheet. The accounts extend from July 5, 1849, to Aug. 24, 1859. The bankrupts commenced with a capital of £8425, and at the time of the adjudication the figures stood as follows:—Creditors unsecured, £53,082; creditors holding security, £17,391; creditors holding coals stopped *in transitu*, £33,592; creditors claiming to be secured by lien on the amount due by the Admiralty for coals shipped under contract, £9010; liabilities on bills receivable, £6113; profits, £88,620; property taken or to be taken by the assignees, £3897; debtors, £4494; securities held by creditors, £7919; amount due from the Admiralty for coals shipped under contract (claimed by creditors), £10,247; partners' drawings—Edward Prior, £6575; Alfred Prior, £15,028; amounts drawn out by J. V. Gooch up to and upon retiring from the partnership of the Norfolk and Eastern Counties Coal Company, £9949; amount advanced to him to be accounted for, £4368; losses, £95,698; trade charges, £34,798; interest, £13,076; deficiency in cashier's balance, £8204.

The COMMISSIONER inquired whether the £3897 would be realized on the property taken by the assignees.

Mr. CANAAN said he thought they would realize nearly the whole of it. The main item in the assets was the amount due from the Admiralty. The assignees had received £2000 of that sum, and they believed they would get the whole of it.

The COMMISSIONER said there appeared to be creditors who had a lien upon it.

Mr. CANAAN said it was more than doubtful whether they would be able to substantiate their lien unless one or more of the ships should be lost.

The COMMISSIONER: On the whole, the creditors having seen these accounts are satisfied that the bankrupts should pass?

Mr. CANAAN: I believe the facts have been truly got at by means of the bankrupts' books. The trading has been enormous and most disastrous.

The COMMISSIONER: Is there likely to be a discussion on the certificate meeting?

Mr. VANDERCOM: On behalf of the assignees we do not object to their passing.

The bankrupts then passed, the 16th of December being appointed for the certificate meeting.

## THAMES POLICE COURT.

OCT. 14 and 15.

(*Before Mr.* YARDLEY.)

NUISANCES ON BOW COMMON.

Mr. *Alexander Angus Croll*, of the Metropolitan Alum Works, Bow Common Lane, Bromley, appeared in pursuance of a summons for an alleged nuisance.

The summons stated that, in and upon the premises of Mr. Croll, noxious gases were copiously evolved from the evaporating-pans and ammoniacal liquor-tanks, constituting a nuisance injurious to health.

Mr. Croll was called upon to show cause why an order should not be made upon him to remove the nuisance, and carry on his trade without being injurious to the health of the inhabitants in the neighbourhood.

The prosecution was instituted by the Poplar District Board of Works, and was conducted by Mr. Serjeant Thomas, instructed by Mr. W. H. Turner, solicitor of Mount Place, Whitechapel Road; Mr. Child, solicitor, of the firm of Wire and Child, appeared for the defence.

The case has been several times before the court, and adjournments agreed upon to enable Mr. Croll to carry on the operation of converting ammoniacal liquor, the refuse of gas-works, into alum in a less offensive manner. Various alterations and improvements suggested by the magistrate, who made a personal visit to the premises in July last; by Dr. Ansell and Dr Ellison, medical officers of health; Mr. Fulcher, sanitary inspector of the district; and by Mr. Croll himself, have been carried out. The parochial authorities and the inhabitants in the vicinity of the manufactory, however, contend that a nuisance still exists, and attended in large numbers to maintain that position. Mr. Croll, on the contrary, brought forward scientific men of great eminence to prove that the process, as at present carried on, was not prejudicial to the health of the inhabitants, and that the noxious effluvia formerly complained of no longer existed.

Mr. YARDLEY recapitulated what had been already done by Mr. Croll to remove many of the objections of the local authorities, and said the great difficulty was the escape of vapour from the tanks containing the ammoniacal liquor.

Mr. Serjeant THOMAS: That is not altered, and we want you to order it to be done. The great question is, I submit, whether Mr. Croll is to be allowed to carry on an obnoxious business in a crowded neighbourhood daily becoming more populous.

Mr. YARDLEY said he had an objection to making any order to suppress a business, or entirely close a large manufactory. If the local board wanted that to be done, an application must be made to a superior court.

Mr. Serjeant THOMAS believed it was not more difficult to get rid of the vapour from the ammoniacal tanks, which poisoned the neighbourhood, than it was to abate the other evils. What was urgently required, if the

business was to be carried on at all, was a lofty chimney-shaft to carry the vapours high into the air after they had passed through a current of flame, or that the sulphuretted hydrogen gas evolved in the process should be entirely consumed, and not allowed to pass into the air at all.

Mr. CHILD said that Mr. Croll had done everything which could be reasonably required of him to abate the offensive nature of the operations on his premises. The learned serjeant assumed there was a nuisance at present existing. He denied there was any. The offensive smells emanated from other ammoniacal works, chemical factories, and blood, fish, and night-soil manure works on Bow Common. He objected to Mr. Croll being put to the expense of erecting a large chimney-shaft, as he had already incurred an enormous expense in carrying out the alterations and improvements already effected.

A prolonged discussion followed, in which it was contended by Mr. Serjeant Thomas that the process at present carried on was prejudicial to the health of the inhabitants, and a nuisance; and Mr. Child argued to the contrary, and that he was prepared to dispute the learned serjeant's proposition by scientific evidence.

Mr. *Robert Warington*, chemist of Apothecaries' Hall, said he attended Mr. Croll's works on the 11th inst. in company with Dr. Ansell. The works were in a state of alteration. The ammoniacal liquor-tanks were in operation, and gaseous matter was evolved. There was a smell of sulphuretted hydrogen. It was a very deleterious and fetid gas. He applied a piece of white test-paper to the vapour, and it became brown. [The witness produced the test-paper.] The vapours issued from the top of the house into the air, and were very offensive. He smelt it thirty or forty yards from the tank shed, and also at the corner of the Bow Road. The vapour was very dangerous both to health and comfort. He had suggested two things to get rid of the nuisance—either to burn the sulphuretted hydrogen or absorb it. The most effective plan would be to have a gasometer into which the vapour could be collected and burnt, or pass it into a chamber containing oxide of iron and absorb it. Oxide of iron was extensively used in the purification of coal gas.

In cross-examination by Mr. CHILD, the witness said he would not undertake to say the offensive smell he experienced in the street came from Mr. Croll's alum works.

Mr. CHILD: Sulphuretted hydrogen is evolved from other works about.

Mr. *Warington*: The Night-Soil Manure Works on Bow Common are very bad indeed.

In answer to another question by Mr. Child, the witness said that four barges were delivering gas liquor at the ammoniacal works adjoining Mr. Croll's premises, one only was discharging the liquor into Mr. Croll's alum works.

Mr. CHILD: There are abundance of these manufactories going on upon Bow Common.

Dr. *Thomas Ansell*, medical officer of health, Poplar district, confirmed the evidence of Mr. Warington. He was well acquainted with Mr. Croll's works, and had passed them daily at all times, and had experienced very bad smells. He could identify the sulphuretted hydrogen gas coming from Mr. Croll's works at a great distance, and sometimes in his own house, half a mile off. The defendant's works were a great nuisance to persons living near them, and very injurious to health. A publican's brass taps, more than 200 yards from the factory, had been tarnished by the gas evolved. On the 11th of July last, in company with many inhabitants, he followed the scent half a mile from Croll's alum works to the factory itself. He found the identical noxious smell from the Bow Road to the manufactory. On Sundays, he had smelt the noxious gas from Croll's factory, when other factories were not at work.

In cross-examination, Dr. Ansell said there were other noxious factories on Bow Common, on the banks of the Lea Canal, too numerous to mention. He did say that the noxious smells which affected him and others came from Croll's factory.

Mr. *Rippingham*, a retired solicitor, of the Wellington Road, confirmed Mr. Ansell as to what occurred on the 11th of July, and said he had at other times been much affected by the noxious gases from Croll's works, and if he had not laid out from £1500 to £1800 on his premises, he should have left them long since.

Mr. *Tomlin*, who has expended £25,000 in the erection of houses, in Bromley; Mr. *Wicks*, builder; Mr. *Day*, cornchandler; and Mr. *Robert Parker*, surveyor, spoke to the visit to the works on the 11th of July, and said they had experienced the ill effects of the noxious gases from Croll's factory at other times, and within the last few days.

They admitted, in answer to Mr. CHILD, there were other nuisances near the defendant's premises.

Mr YARDLEY: They have been all before me, and in consequence of the proceedings of the local board, the nuisances have been to a great extent abated.

Mr. TURNER: And one blood and fish manure factory suppressed altogether.

Mr. *Edward Fulcher*, sanitary inspector, said: I have traced bad smells to Mr. Croll's factory. I do not like them. They are very distasteful. A tall chimney-shaft ought to be erected to take them away.

Mr. CHILD, in a lengthened and eloquent speech, contended that if the magistrate issued the order prayed for, he would shut up a manufactory in which a capital of £20,000 had been embarked, and the consequence would be ruinous to Mr. Croll. The case was now confined within a very narrow issue, but an important one—viz., was there sufficient to justify the magistrate in making an order to suppress a most important business? Mr. Croll had done all that laid in his power, and at a great expense, to remove objections. Mr. Croll had been set down as coming to a garden of roses, but that was not so. Mr. Croll had not added to the nuisances on Bow Common, but had taken a place amongst a score of others. It was not like going to Grosvenor Square or Belgravia. That there was a certain amount of unpleasant smells could not be denied, but not to the extent that was represented, or to justify such a bold interference with the operations of trade and the employment of capital as was now proposed. The state of things which existed on the 11th of July did not now exist. Mr. Croll had removed the ovens from which the exhalations complained of arose, and that was admitted on both sides. Mr. Tomlin and Mr. Wicks were builders and proprietors of houses, which they let to persons to whom any odour was offensive, and the evidence of those gentlemen ought not to be taken as disinterested.

Mr. YARDLEY: If the whole force of the law was put in motion Bow Common would not be a pleasant neighbourhood to live in.

Mr. CHILD said the evidence he should adduce would show that bad smells were evolved from other places, and he would leave the case in the hands of the magistrate with perfect confidence that he would not stretch the Act of Parliament, and if he abstained from interfering, the parties could then be left to their common law remedy.

*Alfred Swaine Taylor*, Esq., M.D., professor of chemistry, said he had been to the defendant's works. He was there on the 6th, with his prejudices opposed to the defendant, expecting to find a different state of things to that which actually existed. The vapour was from a tank into which ammonia was passing from another tank at a boiling heat of 220°. He provided himself with test-papers, which he held over the vapour. It showed a small quantity of sulphuretted hydrogen. The conclusion he came to from an inspection of the works was this, that sulphuretted hydrogen was not evolved in sufficient quantity to extend to the neighbourhood, and was not a nuisance.

In cross-examination by Mr. Serjeant THOMAS, the witness said the gas evolved could not affect the throat. The witness who had said so formed a wrong judgment. It would produce sickness.

In answer to Mr. YARDLEY, Dr. *Taylor* said his test was fairly applied, and that the paper was only slightly discoloured.

*William Odling*, Esq , M.D., professor of chemistry and medical officer of health for Lambeth parish, visited Mr. Croll's works on the 7th inst. He applied a test for the sulphuretted hydrogen He did not detect it one yard from the surface of the liquor. He did not believe any sulphuretted hydrogen could be recognized outside the works. What the witnesses smelt no doubt was sulphureous acid. There was a slight smell of sulphureous acid, which would destroy the other.

Mr. Serjeant THOMAS: Then we have the antidote with the bane.

In cross-examination, Dr. *Odling* said: I held a test-paper over the pipe from which the vapour was issuing. It was slightly discoloured. Sulphureous acid is always present in the manufacture of alum. I do not consider Mr. Croll's works a nuisance.

Mr. *William Murdock*, M.D., medical officer of health for Rotherhithe, said he had visited Mr. Croll's factory four times. He went to the works that morning. He detected sulphuretted hydrogen and put his test-paper over the tank containing the ammoniacal liquor. It came out rather darker than Dr. Taylor's paper, but not so dark as Mr. Warington's. He breathed vapour over the tank two days in succession. In no part of the building could he perceive the sulphuretted hydrogen gas except near the tank. He should not consider the alum works a nuisance to the neighbourhood at all.

Cross-examined: The works have changed their character. The sources of nuisance have been suppressed. There is a great deal of prejudice on the part of the people who have been examined for the prosecution. That is my belief. I do not believe the smell from the tanks in the factory would be perceptible fifty yards off. I perceived a smell to-day, but not that of sulphuretted hydrogen.

Mr. *Duncan* and Mr. *Sheridan*, persons in the employ of Mr. Croll, were called to prove that the ordinary operations were going on when the last three witnesses examined the works.

Mr. Serjeant THOMAS replied on the whole case in an able address, which lasted two hours. He strongly urged the magistrate to make an order, and not allow Mr. Croll to poison the neighbourhood in which he carried on his works any longer. He thought the evidence of Dr. Taylor, Dr. Odling, and Dr. Murdock would have been very different if they had been retained for the public interests instead of being retained for the defendant; but their testimony—coming as they did from a distance—ought not to outweigh the positive testimony of Mr. Warington, Dr. Ansell, Mr. Fulcher, and the host of respectable inhabitants living near the works, who had been affected by the sulphuretted hydrogen gas. He suggested that the operations might have been altered when the defendant's medical witnesses examined the works, or something mixed with the ammoniacal liquor to prevent the smell.

Mr. YARDLEY, in summing up the whole case, said the frequent discussions of this case had been productive of much good. The question was now narrowed into this, was there a sufficient amount of sulphuretted hydrogen to injure health and be a nuisance? The importance of this case all must admit. He felt in a great degree the responsibility of disposing of cases of this public importance, and should feel more if he did not know there was an appeal open to either party to a superior court. The evidence for the prosecution rested chiefly on a state of things long since gone by. There was not that conflict of evidence which at first sight might appear. He did hope and think that the state of things which existed on the 11th of July, when the inhabitants in a body traced the bad smells to Mr. Croll's works, was quite reconcilable with the state of things which existed when the three eminent members of the faculty, called for the defence, visited them a few days ago. He believed that Duncan and Sheridan were the witnesses of truth, and there was nothing to lead him to suppose the operations were carried on differently when Messrs. Taylor, Odling, and Murdock visited the works. Their visits were made unexpectedly, and the usual operations were going on. He believed it would be to Mr. Croll's interest to convince his neighbours that he was anxious to carry on his works without being offensive. The Poplar Board of Works and their officers had done their duty, and if they did not like to adopt his judgment they could proceed to investigate the case before another court. He declined to make the order asked for, and as far as the summons was concerned, he dismissed it.

Mr. Serjeant THOMAS asked for costs, and said they ought to be allowed, because, in the early days of the investigation, a nuisance was proved to exist.

Mr. YARDLEY said at the time the summons was taken out there was certainly a nuisance. It ought, however, to be recollected that Mr. Croll, who was a man of great scientific attainments, was utilizing an article hitherto worthless, namely, gas liquor, and converting it by an ingenious process into alum. These were valuable results from a liquor considered dangerous and useless before.

Mr. Serjeant THOMAS: For his own benefit he does it.

Mr. CHILD: My answer to the application for costs is this: no order has been made, and no costs can be ordered.

Mr. YARDLEY took the same view of the matter, and declined to make an order for costs.

---

## INQUIRY INTO THE ORIGIN OF THE FIRE ON THE PREMISES OF THE PARAFFIN LIGHT COMPANY.

(*Before Mr. Serjeant* PAYNE, *Coroner for the City of London, and a Jury.*)

An inquiry into the origin of the late fire on the premises of the Paraffin Light Company, No. 18, Bucklersbury, took place on Tuesday, the 18th inst., in the Court of Common Pleas, Guildhall.

Mr. PEARSON, the City Solicitor, conducted the inquiry, at the request of the City authorities, and Mr. TINDAL ATKINSON, barrister, instructed by Mr. SMITH, solicitor, Frederick Place, Old Jewry, appeared on behalf of the Paraffin Light Company.

*Henry Allen*, the first witness, deposed that he resided in Barge Yard, Bucklersbury. On the evening of the fire he was at work on the premises No. 6, Barge Yard, Bucklersbury, at the rear of the premises occupied by

the Paraffin Light Company. His attention was attracted, about half-past seven o'clock in the evening, to a light on the premises No. 18, Bucklersbury, in the occupation of the Paraffin Light Company.

Mr. TINDAL ATKINSON said he had no wish to unnecessarily prolong the inquiry, and would therefore admit the premises in question were occupied by Mr. James Young, of Glasgow, who was the proprietor of that part of the business carried on on these premises.

Mr. *Allen* continued: The fire was extinguished in about an hour after its commencement. The under and upper parts of the premises were much burned.

*Alfred Tozer*, one of the Fire Brigade, deposed that he was called to the fire about 7.40 p.m. The engine from Watling Street immediately followed. He found the fire raging in the lower part of the premises situate at the corner of Barge Yard and Bucklersbury. The fire was raging fiercely at the time. He heard no explosions during the fire. Two powerful engines were put to work immediately, but it took about an hour and a half to get the fire under. He had the hose, and followed the fire up. When it was got under, he found on the ground-floor of the back warehouse a cask, or the remains of one, besides a number of tin cans. After that he went to the basement, and there found, both front and back, a number of casks (36 gallon casks), straw, tin cans, hampers, &c. Fire had fallen from the back ground-floor to the basement, which he extinguished before it reached the front basement, where the casks were. A cask was burning in the back basement, but he could not say if there was a liquid in it.

Cross-examined by Mr. T. ATKINSON: He had attended fires at public-houses and oil-shops. He was not aware when he first went to the premises that they belonged to the Paraffin Light Company. When he entered the premises he found a charred cask on the ground-floor, but he could not say if it had oil in it. There were four or five engines at the fire. He did not count the casks on the premises.

*John Bridges*, a member of the Fire Brigade, confirmed the last witness's evidence, and added, that he went the following morning to the premises, and obtained a sample of the paraffin oil for analyzation.

Mr. *Hubbard*, solicitor, Bucklersbury, deposed that he occupied the premises adjoining the Paraffin Light Company's premises.

Mr. PEARSON proposed to ask Mr. Hubbard questions relative to the offensive nature of the article sold on the premises.

Mr. T. ATKINSON objected. The object of inquiry was with reference to the fire only—whether it was wilful or accidental—and not whether the trade was a nuisance.

The CORONER said he understood the inquiry was to branch off so as to ascertain whether, besides the cause of the fire, this was a proper trade or business to be carried on in a crowded city, and not necessarily involving danger to life or property.

After a lengthened argument between the learned gentlemen,

The CORONER said it was desirable the jury should inquire into the circumstances connected with the fire, and if the learned counsel objected to that course the court must proceed without the assistance of the learned counsel in entering into it.

Mr. T. ATKINSON then withdrew his objection.

Mr. *Hubbard* was then examined, and deposed to the injury to his house by the fire. Before the fire he had reasons to apprehend danger from the nature of the business, and complained to the proprietor and the police.

Mr. *Ellis Were* deposed he was in the employ of Messrs. Horner, opposite the Paraffin Light Company, in Barge Yard. The Messrs. Horner's premises are connected with the premises in question. He and his wife and family resided on the premises, and he had observed large quantities of this oil taken in by the company—sometimes twenty casks at a time, holding from thirty to thirty-six gallons each. On the night of the fire, about seven o'clock, he went up Barge Yard, and saw lights on the premises, and a man racking off oil. He thought it dangerous, and went in and saw the foreman, who, however, assured him (witness) there was no danger. About twenty minutes after he was fetched on account of the premises being on fire. The foreman took pains to show him the construction of the lamps used, so that danger could not result from them. It is not usual to rack off oil or spirits after dark. He thought the quantity of straw about the premises objectionable. He and his family lived in a state of alarm from the contiguity of these premises.

Mr. *J. T. Horner*, drug merchant, Barge Yard, Bucklersbury, said that from the manner in which business was carried on in the Paraffin Light Company's premises he felt in considerable danger. In consequence of what passed between him and his neighbours, he caused his clerk to communicate with the Paraffin Light Company. From the continuous smell from the premises, he felt certain a fire would speedily arise. Unless the Paraffin Light Company removed, he should be obliged to remove from premises that had been occupied for 120 years by his family.

Cross-examined by Mr. T. ATKINSON: He had no colza oil on the premises, but he had 20 or 30 tons of castor oil. He had no scientific knowledge on which to base his opinion relative to his apprehension of a fire. He had no turpentine or any inflammable matter on his premises. He did not know if the fire was wilful or accidental.

Mr. *Warington*, chemical operator of the Society of Apothecaries, said that he had received a notice from Mr. Braidwood, requesting him to let him know the inflammability of paraffin oil as compared with spirits of turpentine and camphine. He reported that the sample of coal naphtha burns with a carbonaceous flame, requiring great air to burn it. It boils at 160° of Fahrenheit, or 52° below water. It then gives off inflammable vapours, which are highly dangerous. Camphine would ignite at 115° Fahrenheit, paraffin at a heat of 140°.

Dr. *Letheby* deposed he had analyzed a bottle of paraffin oil. On March the 13th he received from Mr. Stuchbury a sample of paraffin oil, which he had submitted to examination. He found it to be oil obtained by the destructive distillation of bituminous coal or shale. It was lighter than water, and gave off vapour at various temperatures, causing a peculiar smell. The vapour was inflammable at 140°, and burned freely from a wick or open saucer at 160°; by redistillation it yields a very volatile oil indeed, the proportion of which is about one-fifth of the whole liquid. It was this volatile oil that gave the odour to the oil, and was the cause of its inflammability at low temperature. The other portions of the oil were of a more fixed character, and did not inflame or give off vapour under a temperature of 300°. The vapour of the light volatile oil, when mixed with air, formed a very explosive compound. He regarded the liquid as a very dangerous one when stored in large quantities, without the greatest care and precaution. Its vapours were injurious to health when inhaled, and very inflammable in warm weather, especially in summer, and, from the oil not drying like ordinary spirits, but remaining fixed on any absorbent matter upon which it falls, it was very liable to combustion from the falling of a lighted match, and, therefore, more permanently dangerous than camphine, spirits of wine, &c. He thought the oil ought not to be sent into commerce with this light volatile oil in it; and from what he had heard to-day of the manner in which it was stored, great danger was likely to result. In crowded places it should be stored in fire-proof rooms, which should never be entered, under any circumstances, with a light, except a safety-lamp, such as Sir Humphrey Davy's. No straw, rags, or absorbent materials ought to be permitted where it was stored. It differs essentially from the fixed oils, such as colza and castor oils. Paraffin oil stored, &c., as he had heard to-day, was exceedingly dangerous to health and property.

Cross-examined by Mr. T. ATKINSON: Methylated spirit was very inflammable—gin 80°, turpentine 92°, and paraffin as he had named. The difference in danger arose from this, that the former dried speedily, but paraffin oil did not. He should not have expected an explosion at the fire; he should have expected explosion from the charred barrel, but it depended upon conditions of which he was not then aware. If the head of the barrel had been burnt off he should have expected the oil would have burned, but not an explosion. There was one element wanting. He found it very explosive, and that fact was worth more than statements or hypotheses.

Re-examined: If the barrel had burst out, and the oil spread, it would be impossible to say what would have been the consequences.

This was the case on the part of the City authorities.

Mr. TINDAL ATKINSON addressed the court at great length on behalf of his clients, and repudiated the idea that paraffin was of such a highly dangerous character as had been represented. He looked upon this fire as a very common one, and such as takes place in the metropolis every day.

Mr. *John M'Carthy* was in the employ of the Paraffin Light Company. He was present when the fire took place. There was a little straw on the ground, and one barrel of oil there. The oil was put into tin cases, and then sealed with wax, which was heated by a piece of lighted paper. The flame of the paper was put out by pinching the paper with the fingers. He first saw the fire at his feet and tried to put it out, but could not. There was another barrel of oil which was a little leaky. The barrel he was racking off had the contents consumed.

*Thomas Scott* said that he was in the employ of the Patent Paraffin Light Company. There was a quantity of loose straw lying about on the floor, as they had been packing all the afternoon. There had been more packing that day than usual. The cask which he had been racking off was consumed; another cask was charred, but the liquid was not destroyed. He thought the fire arose from accident.

Mr. *M'Carthy* said that he dealt exclusively in paraffin oil. When at the Oxford Street branch they used to work all night with naked lights.

Dr. *R. D. Thompson*, lecturer on chemistry at St. Thomas's Hospital, deposed: This oil could not be set on fire by a lighted match at the usual temperature. He agreed with Mr. Warington and Dr. Letheby as to the temperature at which it would ignite. According to his experiments, it would not give off an inflammable vapour at the temperature of the day. It was much less dangerous than gin and turpentine. He found gin to boil at 190°. At a temperature between 80° or 85° it was inflammable. He found with paraffin he had to heat it up to 130° before ignition. He had extracted six or seven oils from it, but not volatile. The volatile part was exceedingly small in comparison to the others. The witness gave evidence with reference to the inflammable character of many of the spirits of commerce in comparison with paraffin, showing that the latter was the least inflammable, and consequently the least dangerous. If a floor was saturated with the oil, it would not ignite with a lighted match or paper; it required artificial temperature to raise the vapour. He saw the cask after the fire; it was charred and was leaky; the fire around the cask had not been sufficiently strong to produce vapour, or there would have been an explosion. A fire in a cellar stored with spirits would cause explosion.

By Mr. PEARSON: He had been unable to ascertain how much air was necessary to cause an explosion; he thought the manner in which this oil had been stored and dealt with, as shown in the evidence, was dangerous to health and property.

By a JURYMAN: The vapour did not arise, when thrown on rags, wool, &c., until heated. Twenty gallons of brandy, stored as this oil was, would be more dangerous than twenty gallons of paraffin oil. Without heat applied to it, this oil was not more dangerous than other spirits.

Mr. *J. Thomas Way*, 15, Welbeck Street, Cavendish Square, analytical chemist, gave similar evidence with reference to the inflammable character of this oil in comparison with other oils and spirits. Paraffin oil could be speedily extinguished with water. Turpentine stores, in equal quantities with paraffin, were more dangerous than the latter. With proper care, and moderate arrangements, there was no more danger attending paraffin oil than spirits. The vapour was dense, and would not ascend like gas. A lighted match dropped on some paraffin oil spilt on a table took two minutes to ignite—it then burnt fiercely.

Mr. *M'Haffie*, the agent, deposed they were very busy on the day before the fire, and arrangements were being made to facilitate the business and the extra precautions in packing.

By Mr. PEARSON: It was usual to seal the cans with sealing-wax.

Mr. T. ATKINSON said he should call no further evidence.

The CITY SOLICITOR addressed the court at some length, and pointed out what the duty of the jury would be in shaping their verdict.

Dr *Letheby* tried some experiments in a saucer, and the liquid readily ignited with a piece of lighted paper.

The Company objected to the experiment, because blotting-paper was used; and, at the request of Mr. Atkinson, some of the oil was fetched from Bucklersbury, and tried with a piece of lighted writing-paper, and the liquid also burned in a saucer.

The CORONER said this was an inquiry under an ancient statute, to ascertain when a house has been burnt down whether it was done wilfully or accidentally, previous to ulterior proceedings. In this case there could be no doubt the fire was accidental, but then arose the question whether the oil could safely be stored in a crowded thoroughfare, or whether it was dangerous to life and property.

The Jury then retired, and after an absence of twenty-five minutes returned into court with the following verdict:—"That the fire was accidental; and the jury are of opinion there was great neglect, and a thorough absence of the necessary precautions. The jury are further of opinion that paraffin oil, when stored in such large quantities, is of a character dangerous to the immediate neighbourhood."

Mr. T. ATKINSON said the suggestion of the jury would be attended to. In future the company would only keep small quantities upon the premises for immediate use or supply.

The proceedings then terminated.

---

THE LIGHTING OF OLDHAM.—We understand that the Town Council contemplate making experiments shortly with a view to lighting the street lamps by electricity. If successful it is expected only four men will be required to attend to the lamps, which now require more than a dozen.

# Miscellaneous News.

## LONDON GASLIGHT COMPANY.

The Half-Yearly General Meeting of the Shareholders of this Company was held at the Freemasons' Tavern, Great Queen Street, on Wednesday the 12th inst.—E. HAWKINS, Jun., Esq., in the chair.

The notice convening the meeting having been read, the seal of the company was affixed to the register of proprietors.

The following report of the directors, with the profit and loss statement for the half year ending the 30th of June last, were taken as read.

Your directors submit to you the balance-sheet and half-yearly account, showing the result of the manufacture and distribution of the company's gas up to the 30th day of June last. A statement of the profit and loss for the past half year is annexed to this report. It will be seen, that after appropriating £750 to the redemption-fund, the sum of £17,131. 3s. 6d. remains applicable to dividend. Out of that sum the dividends upon all classes of preference shares and stock will be paid on and after the 15th instant; and the directors recommend that, at the same time, a dividend of 15s. per share, being at the rate of 3 per cent. per annum, be paid upon the ordinary shares which were paid up in full on or before the 30th day of June last.

The transactions of the past half year have been, upon the whole, extremely satisfactory. Our shareholders will perceive that the increase of gas rental upon that of the corresponding previous half year—namely, about £5000—has been greater than in any similar period since the formation of the company; notwithstanding which, the measures taken to meet the increased demand, and at the same time to improve the quality of the gas, have been so effectual, that complaints of insufficient supply or of deficient illuminating power have been fewer than in any previous winter. The steady increase of business, and the readiness with which its exigencies have been met, may be taken as a secure test of the healthy condition of the company. On the other hand, there has been a considerable falling off in the price obtainable for coke, and this has been only partially met by an improved contract for coal. Another and more serious drawback upon the half year has been the state of disorganization of the stokers, which resulted in the strike in August last.

The new house, to which allusion was made in the last report, as about to be built to enclose the ovens upon the copyhold portion of the premises at Vauxhall, is approaching completion. In the course of constructing it, it has been considered expedient to revise to some extent the process of manufacture.

With a view to ultimate advantage, though with considerable present outlay, the process of removing mains now become useless, and of simplifying the ramifications of those which have been retained, has been continued in the districts which were formerly supplied by other companies in conjunction with our own. This process, as most of our shareholders are aware, has for its object the reduction of leakage, which, in these districts, formerly occasioned so much nuisance to the public, and loss to companies.

The strike of the stokers has necessarily occasioned great expense, both from the previous disorganization among the men, and the cost of procuring at a moment's notice, and subsequently training, new hands, the majority of whom were procured and conveyed to London from distant parts of the country. This large expense must necessarily go to diminish the profits of the current half year. But whether the profits be great or small, the shareholders have, in the accounts before them, the best evidence that the company is making steady progress, and that the measures which for several half years have produced such successful results, have not yet ceased to operate.

*Dr.* PROFIT AND LOSS, FOR THE HALF YEAR ENDING JUNE 30, 1859. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To coals | £27,729 | 13 | 4 | By gas | £59,399 | 15 | 0 |
| Purifying materials | 509 | 5 | 3 | Coke and other products | 14,740 | 15 | 5 |
| Stores | 1,306 | 6 | 2 | Rents | 504 | 12 | 11 |
| Wages | 9,230 | 6 | 5 | | | | |
| Wear and tear | 2,588 | 9 | 1 | | | | |
| Royalty | 334 | 10 | 0 | | | | |
| Meters—repairing and fixing | 1,031 | 19 | 4 | | | | |
| Directory and auditing | 680 | 0 | 0 | | | | |
| Salaries | 1,718 | 10 | 0 | | | | |
| Rates and taxes | 1,162 | 18 | 5 | | | | |
| Rents | 777 | 1 | 0 | | | | |
| Commission | 1,012 | 16 | 6 | | | | |
| Stationery and incidental expenses | 693 | 14 | 1 | | | | |
| Allowances and bad debts | 1,339 | 13 | 11 | | | | |
| Law expenses | 500 | 0 | 0 | | | | |
| Depreciation | 7,254 | 9 | 2 | | | | |
| Income-tax | 57 | 19 | 7 | | | | |
| Balance | 16,817 | 11 | 1 | | | | |
| | £74,645 | 3 | 4 | | £74,645 | 3 | 4 |
| Interest on borrowed money | £2,962 | 14 | 6 | Balance brought down | £16,817 | 11 | 1 |
| Redemption-fund | 750 | 0 | 0 | | | | |
| Balance | 13,104 | 16 | 7 | | | | |
| | £16,817 | 11 | 1 | | £16,817 | 11 | 1 |

*Dr.* DIVIDEND-FUND. *Cr.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| To amount of preference share dividend, April 15, 1859 | £8,306 | 5 | 0 | By surplus profits, December 31, 1858 | £16,680 | 14 | 4 |
| Ditto debenture stock dividend, April 15, 1859 | 953 | 12 | 5 | Balance as above | 13,104 | 16 | 7 |
| Ditto ordinary stock dividend, April 15, 1859 | 3,394 | 10 | 0 | | | | |
| Balance | 17,131 | 3 | 6 | | | | |
| | £29,785 | 10 | 11 | | £29,785 | 10 | 11 |

The SECRETARY (Mr. Hinde) read the particulars of the balance-sheet.

The CHAIRMAN: Gentlemen, it is now my duty to move "That the report of the directors and the accounts now laid before the meeting be received and adopted," and in doing so I have very few words to add to that report. The directors have now, as they have always done before, endeavoured to make their report, as far as possible, a full and true statement of the existing condition of the company. We have been encouraged to do so on the present occasion by a fear lest, from the very rapid progress of the company during the last two years, our shareholders may be led into a little impatience, and may be tempted to think that the same amount of rapid progress will characterize the years that are to come. We wish them, therefore, clearly to understand that the rapid progress we have made is the result of very hard work for ten preceding years; that those ten preceding years had brought our accounts into a very satisfactory state, and had enabled us to place the works in such order as to make profits certain. Now, however, the greater part of those profits have been realized, and although there are several things remaining to be done, yet, for the future, we must look more to the steady increase of our business, and expect that our profits will increase only in the same ratio as those of other companies. Still, as I say, there are some things remaining to be done, and we particularly wish that the shareholders should not take the half year which has just past, nor the current half year, as true examples of what the company are able to do. There were several great drawbacks in the half year which has gone by, and the strike of the men will operate very detrimentally to the divisible profits of the company in the present half year. I think, nevertheless, that the shareholders will probably be satisfied that our progress is real when they look at the accounts and see that the rental for the last half year has increased by £5000 upon that of the corresponding previous half year, and when they are told of the general efficiency of our supply, the best test of which is that the leakage at present is very little over 20 per cent.; that we hope still further to reduce it, and are taking the most effectual means to achieve that object. Another drawback which we have experienced, besides the demoralization of the workmen previous to the strike, has been the considerable falling off in the price obtained for coke. Had we obtained during the past half year the same price as we did previously, we should have had £2000 more to carry to profits. Of course this is a matter which, while we deplore, we must admit is altogether beyond the control of the directors. The next item which the shareholders will be likely to look at is that for "Law expenses." They will have seen that for several half years the sum of £500 has been carried to the debit of profit and loss for this item, and they will no doubt think it is an enormous current amount. The cause of it is this: we have brought an action against the parish of Chelsea for the amount due to us for the public lights. The parish refuse to pay our charge for the gas supplied to the public lamps, alleging that they have not had the full quantity of gas for which they contracted. We, on the contrary, allege that they have had it, and I hope before we next meet you here the result of the action which has been brought against them will be known. Another matter which has tended to increase the item of "Law expenses" is the necessity we have been under to appear before a committee of the House of Commons with reference to a bill which has been brought in for two sessions, and will probably be introduced again next session, for regulating the supply of gas in the metropolis. We are, however, under no apprehension, whatever that bill may be, that in the result our company will be in any way injured thereby. We are perfectly sure that the operation of it will be, in some way or other, beneficial to the public, as it will enable them, by means of the strict examination which will take place before the House of Commons, to comprehend the fact that the gas companies of the metropolis are not making the enormous profits which it is supposed they are doing, and that they are not expending their whole energies in cheating the public. Before sitting down, I cannot forbear expressing my thanks to my honourable friend opposite—Mr. Gray—for the eminent services he has rendered, not only to his own company, but to gas companies in general, by the admirable way in which the case in support of the City Gas Bill was got up, and the attempt of the corporation of London to prevent the company getting a new charter was frustrated. The admirable way in which that case was got up has proved to the House of Lords and to the House of Commons, and it has proved also to the public at large, that the manufacture of gas is not of necessity detrimental to the public health, the complaint of which is the greatest cause of annoyance with which gas companies have had to contend. And now, gentlemen, there is but one other matter to which I will allude, and that is to the very heavy debt of gratitude we all owe to our officers and servants for the assistance which they gave us during the strike of our men. If any of our shareholders had been present and seen what I and Mr. Sprague, as well as others, saw when that strike took place, they would have been able somewhat to judge of the really perilous state in which we were placed. Every one of our experienced hands left us at once, and we were obliged to pick up men to supply their places where we could get them, and at considerable additional cost—three sometimes being required to do the work of one, and that, too, for a long period of time. Then, too, our being obliged to supply the place of Newcastle coal with cannel coal caused great expense to the company, added to which was the necessity of feeding the men, finding them in beds, bringing them up from distant towns—in fact, I never saw so thorough a state of disorganization in all my life. The admirable way in which Mr. Jones, our engineer, and the clerks assisted on that occasion—every man turning to with coats off, some taking one office and some another—deserve, and I am sure will have, your best thanks. With these observations I move the adoption of the report.

Mr. RHODES seconded the motion.

Mr. TAYLOR: Sir, having lately become a shareholder among you, and having for some of my shares paid above par, you will not be surprised that I am not satisfied with the paltry dividend which you intend to pay for the past half year, more particularly as the report, meagre and imperfect as it is in many respects, shows a balance of £17,131 applicable to dividend. I make out that that is sufficient to pay 5 per cent. upon the ordinary shares, and leave a balance of some hundreds of pounds in hand.

The CHAIRMAN: I am very glad you have made the remarks to the meeting which you have done, and it was partly to meet such remarks that I made the statement I did when I moved the adoption of the report. It is just what I feared when I saw the quotation of the market price of shares. I feared the public would be induced to purchase at a price above their proper value. I do not consider that we are entitled to have our ordinary shares sold at par until we can realize something more than 3 per cent. upon them. But it will be a sufficient answer to your remarks to tell you that for eleven years there was no dividend paid upon those shares at all.

Mr. TAYLOR: So much the worse.

The CHAIRMAN: Last half year only were we enabled to pay the full dividend upon our preference shares, and to resume the payment of dividend upon the ordinary shares of the company. I think that for us to be able to jump at once from nothing to 3 per cent. was no trifling evidence of the satisfactory position into which our affairs have been brought. I do not like

to say whether we ought to look forward to any increase upon this amount for the next half year; I can only repeat that the company is in a good condition, and, but for the drawbacks which I have mentioned, I think we should have been able to do so. I do not think the directors are open to any reflections on that account. With regard to the £17,131 which the report states is applicable to dividend, I would say that the balance of profits for the half year are £13,104, and the sum we actually divide is that £13,104, less some £400 which has gone to increase the dividend-fund. It is always desirable to keep in the dividend-fund a sum larger than what you divide. Suppose next half year we do not make any profits as we have this, it would be a serious matter to diminish the existing dividend. The company are not to blame for any sum paid in the market for ordinary shares, but I may say that I do think purchasers of shares should look at the published reports before they give a high price for shares. We have always endeavoured in our reports to tell the truth as to the position and prospects of the company.

Mr. Taylor: In the statement of accounts there is a fearful increase on some of the items of expenditure. "Wages," I see, have increased by the alarming sum of £2500 since last year. Then there is "Salaries," on which there is an increase of £152, and "Commission," which has increased at the rate of £370.

The Chairman: I wish that item was double the amount. It is the expense of collection—in fact, a per centage upon your rental.

Mr. Taylor: It is a higher per centage than last year.

The Chairman: No, but it is upon a larger rental.

Mr. Gray: I wish it was £2000.

Mr. Taylor: There is another item which I wish to have explained to me —"Wear and tear." Is it wear and tear of nothing?

The Chairman: No; of a great deal. It includes all our meters, all our retorts, and our plant in general.

Mr. Taylor: Do you not credit yourself with the value of the plant, and each year take off something for depreciation?

The Chairman: You will see a little lower down, there is an item, "Depreciation, £7254." That is a large amount for leasehold, and for many half years we have written off £7000.

Mr. Taylor: I see there is an increase of £300 to the directors.

The Chairman: At the last half-yearly meeting, that increase was voted to them by the proprietors.

Mr. Taylor: Rather prematurely, I think. As I look at the matter, all gas property should pay 5 per cent., and until it does so the remuneration to the directors should certainly not be increased.

The Chairman: You are a new shareholder, and do not know anything of the former position of our affairs. The company was taken up when it was on the verge of bankruptcy, and for eleven years we paid no dividends upon our preference or ordinary shares. If the directors have brought the company into a position in which they have more than trebled or quadrupled the profits, even though they are only able to pay 3 per cent., I think some credit is due to them.

Mr. Taylor: This increase would have come better when the unfortunate original shareholders had been paid a fair interest upon their money.

The Chairman: I am, unfortunately, an original shareholder myself.

Mr. Taylor: Why has there been all this increase in the wages? It is monstrous.

The Chairman: The increase of wages, in the first place, arises from the fact that the amount of work done has much increased. The quantity of coals carbonized has been much greater, and £10,000 more annual rental is the result.

Mr. Taylor: We do not know this from the accounts.

The Chairman: The report states that there has been an increase in the rental for the half year of £5000. Besides this, there has been a general increase in the rate of wages.

Mr. Taylor: Yes, it is an increase of 12 per cent., which is more than the carpenters have struck for.

The Chairman: The wages had gradually increased during the last half year before the strike took place. One cause of it was that we, in common with the gas companies generally, have endeavoured to meet the reasonable wish of the men, and give them a Sunday holiday.

Mr. Taylor: But that will not account for £2000.

The Chairman: That alone would account for some 8 or 9 per cent., but there has been an increase of wages beyond that. I believe, however, that our working account will bear comparison with that of any other company in existence. I think, if you will take the trouble to compare it with that of other companies, you will not regard it as unsatisfactory.

Mr. Taylor: What is the amount of the redemption-fund now?

The Chairman: I do not know whether you are aware of the nature and object of the redemption-fund. I may mention that, before we had reserved anything towards a redemption-fund, an opportunity occurred of purchasing some of our own shares, and somewhere about £2100 was expended in that way; but the shares so purchased were worth a great deal more than that. For the last two half years we have appropriated £750 to the redemption-fund for that purpose, and we have thus paid off £1500. The remaining £600 will be provided for next half year. You are perhaps not aware that, under the provisions of our Act of Parliament, £750 will have to be written off every half year until we have raised about £35,000 for such purposes.

Mr. Taylor: Looking at your last half-yearly statement, I find that you had a contingent-fund, amounting to £1600 in December, 1858. Would not that fund be applicable to meet so unfortunate an event as a strike?

The Chairman: There are many contingencies constantly occurring, for which we have to provide, and it is in the discretion of the directors to say out of what fund they shall be met. All we can do is to state the accounts fairly to the shareholders, and if in anything we do wrong, it will be then time to tax us with it.

Mr. Taylor: I cannot at all see why you should not pay us a greater dividend, when you have so large a balance left.

The Chairman: As I said before, we are dividing the whole of our profits except about £400.

Mr. Taylor: How many ordinary shares were fully paid up in June last?

The Chairman: There were 4628 black shares paid up.

Mr. Taylor: You are of course only going to pay dividends upon them?

The Chairman: That is all.

Mr. Rhodes: I rise with great pleasure to express the satisfaction I feel at the way in which the affairs of the company have been carried on to the present hour. I know that the board of directors have passed through many obstacles on the road, but, in spite of these obstacles, I can truly say that, though I have attended many meetings, I have never had occasion to find fault with the board or with their officers. They have paid the greatest possible attention to the affairs of the company, and have succeeded in overcoming many difficulties which at one time surrounded us. Reference has been made to the strike, and I am aware that since the period to which our present report belongs there have been considerable fresh difficulties on that account. As the strike has been mentioned, I may, perhaps, say that I think if a little more conciliation were shown by employers to working men, strikes would not be so serious as they now are. I do not mean to find fault with any gentleman on our board of directors, but I do think that if a conciliatory policy were adopted, strikes might be avoided. There are one or two items in the accounts respecting which I wish to ask a question. The first is the item of "Allowances and bad debts, £1239." That seems rather high, but perhaps you can account for it from some cause or other.

The Chairman: It is high; it is the worst item which appears in our profit and loss account. It is partly occasioned by the sweepings up of old accounts being included. It is, however, though more than it ought to be, less in amount than the previous half year.

Mr. Rhodes: You have commented on the item "Law expenses." I wish to know whether you have brought Hills' action to a conclusion, or whether he is prepared to sit down and be quiet.

The Chairman: I am sorry to say we have not done so at present. You are aware, I believe, that though the action stands in the name of the London Gas Company it is really and truly borne by the whole, or rather by a very large number of the metropolitan gas companies.

Mr. Rhodes: The amount paid for income-tax, as it stands in your accounts £57, is a very small one, and I think there must be a mistake in it.

The Chairman: No; it is a mere matter of account. All our income-tax has been paid, but that which is borne by the shareholders does not appear here. This sum represents the tax upon the surplus profits.

Mr. Rhodes: Referring to the recent Act of Parliament, if a consumer requires his meter tested, at whose expense will that be? Will the company call in the Government inspector?

The Chairman: It seems that, in reference to existing meters, the expense will fall upon the person requiring the meter to be tested. At the end of ten years the companies are bound to supply tested meters.

Mr. Rhodes: When was the register of shareholders looked into by the directors? I do not ask for the purpose of finding fault.

The Chairman: It has not been looked through this half year. About twelve months ago it was examined, and no new shares have been issued since. I will undertake to say that any fraud would be impossible.

Mr. Rhodes: I think you should see that the register is gone through a little oftener than once in twelve months.

The Chairman: The dividends are regularly paid to the holders of the shares, and every transfer is duly registered. I cannot conceive any possible way of committing fraud.

Mr. Gray: Gentlemen, I have gone very carefully through the different items in these accounts, and I have not the slightest hesitation in confirming the statements of my honourable friend in the chair, that this company is conducted with as great economy as any company in the metropolis, or indeed anywhere else. With respect to the increase of remuneration to the directors, to which allusion has been made, if any blame has been incurred it is attached to myself, for it was I who suggested the propriety of the shareholders voting such increase, and, I believe, my suggestion was responded to with the greatest unanimity. I have been in the habit of attending the meetings of this company for some years, and I am sure if the worthy proprietor, who has spoken on this point, had seen all the strife and angry feeling which formerly were exhibited here, his only surprise would be that we were able to find any body of gentlemen willing to submit to the odium which was cast upon them so undeservedly. Nothing, however, has deterred our directors from performing their duty to the proprietors, and I can say with the most perfect confidence that their whole time and attention have been devoted to the interests of the company. It is entirely owing to their untiring exertions in the midst of the many and great difficulties they have had to encounter that our concerns have been brought into a state of great prosperity. With reference to the dividend on this occasion, I think it would have been an act of injustice in the directors if they had recommended a larger dividend than 15s. a share, for, looking at the amount of profit made during the last half year, it is evident that the whole sum is thus expended, except £400. There was an excess last half year, which, however, I think the directors could not well deal with. My honourable friend, the chairman, has alluded to the difficulties and expenses arising out of the strike among the workmen. I am sure they must have incurred very large expenses, which will of course tend to diminish the profits for the current half year. It would, therefore, have been injudicious to give 4 or 5 per cent. on this occasion, and have to reduce the next dividend to 3 per cent. again. Such a course would have had a very injurious effect upon our property. But the policy the directors are adopting is one which will give stability to our affairs; it will maintain the value of our shares, and I am certain, if persevered in, cannot fail to elicit the approbation of every one of the shareholders. My worthy friend has kindly alluded to the struggle in which my company has been engaged. Of one thing I am perfectly satisfied, that if I had not had the sympathies of the gas companies of London, and the kind co-operation of my worthy friend, who presides over us, and of his colleague, the Hon. Arthur Kinnaird, I should not have been so successful. When I entered upon that struggle, I made up my mind that nothing in the world should deter me from carrying it on with all the energy I possessed, fully satisfied that our cause was a righteous one, and relying upon the justice of Parliament in its decision upon it. No doubt every effort was made by our opponents to bring us into disrepute with the public. Letters were sent round, pamphlets were published, and everything done to thwart our endeavours; but happily for us, and every one else, they failed in their object. We have established to the satisfaction of Parliament that a gas company in a populous neighbourhood is not necessarily a nuisance; and when my honourable friend has to go before the Legislature again he will have a strong case to refer to. I avail myself of the opportunity now afforded of thus expressing to the chairman and to my worthy friend, Mr. Kinnaird, who assisted him, my sense of the service they rendered me. I had many acknowledged friends, and many unrevealed ones; and when the attempt was made by Alderman Cubitt to get our bill thrown out on the second reading, I never saw so many honourable members in the House. The appearance of them prevented that attempt being persevered in, and in the end we obtained a complete triumph. I am very glad we succeeded in getting our bill. What the consequences to our company would have been, if we had failed, I cannot tell. We should have had to struggle on under great difficulties, and every year those difficulties would have increased, until probably the property upon which we have expended £300,000 would have been reduced to nothing. Happily, we have escaped the intended infliction, and I hope we shall go on prosperously. Now, with respect to your accounts, they are so perfectly satisfactory, and all the arrangements are so indicative of the care and zeal of our directors, that I shall make no remark upon them, but content myself with one observation before I sit down. I think my worthy friend, Mr. Rhodes, in referring to strikes, recommended conciliation. In my opinion, a more fatal course could not be adopted. Every kind of indulgence should be, and I believe is, shown to the men while they go on with their labour steadily; but if they make unrea-

sonable demands, you ought to resist them to the utmost, whatever the consequence. I hope the directors will persevere in the course they have adopted, while they grant to their workmen every reasonable indulgence. They are a class of men very useful to every gas company; they are well treated I know, and I am not aware of any instance in which they are not well paid. But when they begin to dictate to their employers, and to say, "You shall give us 10 or 20 per cent. more wages than we have hitherto had, or we will forsake your works, and throw all your affairs into disorder and ruin," we must at once and decisively resist such a demand, otherwise society will get into a bad state—the workmen will become masters, and the employers workmen. I hope we shall never see that state of things in this country, because it would be fatal to all our interests; for though, in the first instance, the masters would be the sufferers, before long it would fall heavily upon the labouring classes. I trust there will be peace and quietness in the land; that we shall hear no more of war, and tumult, and confusion; and that our labouring classes will be content to earn their bread by the sweat of their brow. It is quite clear that Providence has placed men in different positions in social life; some work with the head, some with the hands, and some with both. We cannot do without each other; but if we would be happy and prosperous, we must be content to act in concert. I do trust that in future there will be nothing to interrupt the harmony which has existed between the employers and the employed in connexion with gas companies.

The motion for the adoption of the report was then put and carried unanimously.

On the motion of Mr. GRAY, seconded by Mr. RHODES, a vote of thanks to the directors was cordially adopted.

The CHAIRMAN, in acknowledging the vote, said: Gentlemen, in the name of my brother directors and myself, I thank you very sincerely for the compliment you have just paid us. We have always endeavoured to do our duty, and shall continue to do so so long as we occupy our present positions. In reference to the strike amongst our workmen, allow me to say that we did not in that matter deal at all hardly with the men. They were receiving good wages, but they demanded a shilling a day extra. The pay they were in receipt of was at the rate to which it was raised during the time of the Crimean war, when provisions and everything else were much dearer than they are at present. Those wages have never been reduced, and the men were satisfied that they got good wages, but thought that they could manage by means of the strike to obtain more.

A vote of thanks to the auditors having been agreed to,

The CHAIRMAN moved the thanks of the proprietors to Mr. R. Jones, the engineer of the company, and paid a high compliment to that gentleman for his general services, as well as for the special exertions which he made during the recent strike.

Mr. GRAY seconded the motion, and said the chairman had stated that the company were very much indebted to their officers for their services on the occasion referred to. He hoped their additional labour would meet with some extra reward.

The CHAIRMAN assured the honourable proprietor that the matter had not been forgotten.

The resolution was unanimously agreed to, and the proceedings terminated.

## THE IMPERIAL GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Thursday, the 13th of October, at the Offices of the Company, John Street, Bedford Row—W. P. RICHARDS, Esq., Governor, in the chair.

The SECRETARY (A. Henry, Esq.) read the advertisement convening the meeting, and the corporate seal of the company was affixed to the register of proprietors.

The CHAIRMAN then read the following report:—

Your directors have to report that two important bills affecting the interests of gas companies were brought before Parliament last session, one for regulating the measures used in the sale of gas, and the other for regulating the proceedings of gas companies in the metropolis.

The former bill was introduced into the House of Lords by Lord Redesdale, and was hailed alike by sellers and purchasers of gas as supplying an acknowledged want by providing a legal standard for the measure of gas. Your directors gave the bill their most cordial assistance, and congratulate you on its passing into a law.

The latter bill was brought into the House of Commons at the instigation of the delegates of the metropolitan vestries, but wanted all the elements of fairness and impartiality which characterized the former bill, and would have met with the decided opposition of your directors, had it not been thrown out for non-compliance with the standing orders of the House.

Another bill, which was referred to at your last meeting, for extending the West London Railway from the Kensington Canal basin to the River Thames, in close proximity to your Fulham works, received the sanction of Parliament last session, and your directors are happy to report that the clauses which they had caused to be prepared for the protection of this company's interests were inserted in the bill.

Whilst on the subject of your Fulham works, they regret to have to report that the appeal to the House of Lords against the injunction to restrain the use of part of those works, as recently used, was unsuccessful. Measures have, however, been taken to prevent any inconvenience arising to the company, and to the consumers of their gas, from the failure of this appeal.

Another circumstance occurred at the early part of the current half year, which your directors advert to with pain, as entailing great distress upon the misguided men and their families. On the evening of the 27th of July last, and two following days, the stokers at your several stations of works struck for an advance of wages.

Your directors had, fortunately, some intimation of the possibility of such an event, and by the kind assistance of the officers of the Great Northern Railway, your contractors for main laying, lightermen, and coal contractors were prepared for the exigency.

The works were not stopped for a single hour, nor the supply of gas impeded, although almost all the firemen left their work without notice. The numerous applications your directors have since had from other labourers, to supply the places of the disaffected at the same rate of wages, have confirmed them in their opinion that the men had no real ground of complaint. The wages are liberal, every attention is paid to the comfort of the men, and the strike was wholly without excuse. Your directors cannot close this brief allusion to an occurrence which might have been attended with serious consequences to the metropolis, without recording their high satisfaction at the zeal, activity, and good management displayed by the several engineers on the occasion, and also of the efficient and zealous services rendered by the chief inspector, surveyor of mains, station clerks, district inspectors, and other officers of the company, who vied with each other in untiring exertions to aid the new men in the performance of their work.

Your directors now pass with pleasure to the record of your trading operations for the half year, as contained in the accounts laid before you.

The net profits will enable you to pay a dividend at the rate of 9 per cent. per annum, less income-tax, for the half year ending June 30 last, and carry over £2843 to the next half year.

They have, therefore, the pleasure to recommend—

That a dividend for the half year ending June 30 last be declared, at and after the rate of 45s. per share, upon the old shares, and 13s. 6d. per share upon the new shares, less income-tax, and that the same be paid on and after this day.

It may be convenient to the proprietors to know that the directors contemplate making a call of £2. 10s. per share upon the new shares, to fall due the first week in January.

The SECRETARY then read the accounts.

The CHAIRMAN then said: Gentlemen, in rising to move the report I must remark that the management of the affairs of this company, since the last meeting was held in this room, have been more than usually troublesome and vexatious. I will refer to one item in the account which must be regretted. I refer to the item of £2371 for law charges. This expenditure is more to be regretted because it has been productive of no good to any one. It has been forced upon us by the spirit of the times—by a certain class of people who are seeking popularity by pretending to be the friends of the public, agitating always against gas companies, or else by another class of men, professional agitators, who, under the garb of scientific witnesses, are pouring into the ears of the public complaints which they are not justified in making. Their object is, to make money themselves, and to appear in the witness box with their five guineas a day. (Hear, hear.) Those gentlemen who are in the habit of reading journals connected with gas-works, must know that these agitators have not hesitated to put forward statements which are untrue, and which bear upon the face of them the appearance of untruth. This waste of money is much to be deplored, because the practical effect is that it postpones to an indefinite time that which we have so much at interest—a reduction in the price of our gas. It is our interest that the gas should be reduced; the law of the land has now laid down that, when we obtain a certain amount of dividend, the price is to be reduced, and we are most anxious it should be done; but, if we are to waste between £2000 and £3000 one half year, and nearly £1000 another half year, it is quite evident to everybody that these pretended friends of the public are in fact postponing an advantage which we wish, for our own benefit and the benefit of the public, to confer upon them. (Applause.) I will not detain you further upon that subject, but allude now to the bill for regulating measures used in the sale of gas. If there is to be any measure for gas or anything else it is highly desirable that that measure should be as correct as possible, and placed under the best possible regulations. Lord Redesdale, who is the chairman of the committee of the House of Lords, felt this necessity, and very kindly undertook to introduce a bill that should attain the object as far as possible. The London gas companies, when they became aware of the circumstances, did not hesitate to proffer him every information that he might require. They went no farther than to tell him—"We will give you every information if you want it." He very frankly accepted our offer, which I must say has been faithfully performed on the part of the gas companies. (Hear, hear.) The consequence is, that a bill has been framed; the framework and conception of the bill are entirely due to his lordship, and also a great deal of the detail. The filling up of the mechanical parts of necessity devolved upon his assistant, and I must say that nobody could have taken more pains to make a good and just law than that gentleman did, and we are indebted to them both for a bill which, I think, will practically work exceedingly well. (Hear, hear.) I will now refer to another bill, which was brought in by the vestries. I must say that instead of this being as the other was, a bill holding fairly the balance between consumer and manufacturer, it was as unjust in its principles, as one-sided, as oppressive as a bill could be well conceived. We did our best, of course, to oppose it, and took advantage of a standing order of the House of Commons, by which they were incompetent to bring it in that session. Now, I regret very much that the vestries should have taken a course which puts it entirely out of their power to come to any arrangement with us, because I think an arrangement might have been made, beneficial to all parties. In short, I am convinced it might have been done, and we were on the point of coming to such an arrangement. All the clauses and conditions of a bill were discussed and signed by Mr. Locke, the member for Southwark, when, to our surprise, the whole of that arrangement was repudiated. I can conceive no reason for it, because it would have been beneficial to all parties, except that the vestries thought they were powerful enough to force upon us other measures, and they attempted to do it by the bill which I am alluding to. (Hear, hear.) There is, certainly, a very strong feeling on the part of the public that the gas companies are to be squeezed, and they will do their best to squeeze them. We must do our best to protect our own interests, and, as far as we are concerned, we will do it. (Hear, hear.) It is a lamentable thing to come here time after time, and tell you there has been this large sum of money spent in law expenses; but it cannot be helped. I will now just refer to the West London Railway Bill to say that we had our mutual interests to protect. We each protected them in that straightforward way which two gentlemen would do who attend to their business, and the whole thing ended most amicably, and I hope will be useful to all parties. The next subject is, with regard to our Fulham works. We were not able to throw off the injunction, but that being the case, though it was a matter of regret, it was really of no practical inconvenience. We provided against the worst; we have laid our mains, and are fully competent now to generate as much gas as we can possibly want, and distribute it economically without encroaching at all on that portion of the injunction which restrains us. (Hear, hear.) We have nothing at all to pay, so that I think we shall do our work quite as well without Fulham as with it. The next subject is one of a very different nature, and a very painful one, for I now come to allude to the strike of our workmen. It is impossible to be in the management of works of this sort for years, and go weekly amongst a set of workmen without feeling a considerable interest in them. Many of them were very deserving of our interest; but it came to this, that when we went to your committee of works one day, the men were all combined, and they offered to us terms upon which they would work with us; and if we had acceded to those terms, according to our calculation, it would have been 15s. a week additional in the pockets of the workmen. I do not believe any one of them understood it in that sense, but it was enough for us to know they put forward a document, and told us unless we agreed to the terms of that document they would leave our works. It is a very difficult thing to negotiate with persons under those circumstances. If you attempt to sue or persuade them they attribute it to fear, and, although you might persuade them to work on for a day or two, they would always come back to the same point; and if you concede to them demands, you must rest assured another year would not pass over without fresh demands being made. (Hear, hear.) Painful, therefore, as it was to us to separate ourselves from these men, we felt we had nothing else to do; and, before we entered into any sort of conversation with them, we said, "These terms will not be conceded to you; and now we have no objection to talk to you." We then remonstrated with them, and told them what the result would be, and wished them to take till the evening to consider of it; they refused to do so, and there was nothing then but to add to what we had said, firmness. (Hear, hear.) We told them—"If you do not choose to work, those are our gates; you are no longer our servants: go." They were obliged to go, and our business then was to get fresh workmen. Of course it was a matter of considerable anxiety, trouble, and expense, because we were obliged on the instant to hire fifteen men, perhaps, to do the work of ten; but it was an important crisis, and what has taken place since has convinced us that it was the only course we could take. (Applause.) The men had nothing to complain of in point of wages; there was nothing to entitle them to expect greater wages—the only circumstance was, that they were, as they said, better combined than formerly, and, because they thought they had power, they were endeavouring

to exercise it. We told them that we had power too. In a few days these poor men would have been glad enough to have been taken back to their work, but we had got others, and of course were bound to them. The report has stated the obligations we felt to those persons who assisted us. Of course, we were obliged to go in all directions to get assistance, and we were very kindly served by those persons with whom we have been in the habit of dealing—our contractors—and more particularly the Great Northern Railway, who are near neighbours of ours. They assisted very willingly most materially, and so did our contractors, and so did our lightermen, and so did everybody we had any right to expect assistance from. (Hear, hear.) As to our own officers, their conduct was past surprise. Some of those in better situations took the scoop, and showed the men how to use it. (Applause.) I need say nothing on the dividend. Now, I will only just say that I think in January we shall be obliged to call on you for an additional sum of £2. 10s. per share, which call, I dare say, will be responded to very willingly, as we are able to make it worth our while. I have only, therefore, in conclusion, to propose—"That the report now read be approved, and entered on the minutes." (Hear, hear.)

Mr. MALLETT: Allow me to ask whether the appeal with respect to the Fulham works is decided? for I did not quite understand you upon that point.

The CHAIRMAN: That is one of the points upon which I wished to be most distinct. It is decided against us. We are only restrained from using the new retort-house.

Mr. MALLETT: Are you yourselves supplying gas from the Fulham station now for that neighbourhood?

The CHAIRMAN: Not for the neighbourhood of Fulham. By the division of districts, we have ceased to supply Fulham.

Mr. MALLETT: That district which you retained to yourselves by agreement you supply?

The CHAIRMAN: All our own district we supply ourselves.

Mr. WHEELER: I think upon a former occasion the chairman stated that the company had made a contract for coal which at that time was not satisfactory, and I wish to ask whether you are now getting coal at the usual rate you would get it under ordinary circumstances, unconnected with any unfavourable arrangement.

The CHAIRMAN: We have made new arrangements with the same contractor, who was very glad to sell us an additional quantity of coal, and reduce the price to a fair price.

Mr. MALLETT: May we look forward eventually to a profitable service out of the Fulham works?

The CHAIRMAN: We get that already.

Mr. MALLETT: Are you sure of that?

The CHAIRMAN: As you seem to be fastidious about my answer, I will say that eventually we may look forward to a profitable service out of the Fulham works; but I will add that I know that service is profitable at present. (Laughter.)

Resolutions for the adoption of the report and accounts passed unanimously.

A resolution authorizing the payment of a dividend at the rate of 45s. per share upon the old shares, and 13s. 6d. per share on the new shares, less income-tax, passed unanimously.

Mr. POCKETT: Gentlemen, I think we should not separate this day without tendering our thanks to the gentlemen who, during the last six months, have so well conducted the business of this company. We may assure them that we sympathize with them strongly in the troublesome task they have undertaken, and request them to receive our most cordial thanks.

Mr. MALLETT: I have much pleasure in seconding that motion. I think the directors have had a very hard duty to perform, and I think they have done the best they could for us. (Hear, hear.)

The resolution passed by acclamation.

The CHAIRMAN briefly acknowledged the compliment, and the business of the meeting closed.

## THE METROPOLITAN GAS SUPPLY.

### MEETING OF THE DELEGATES.

A Meeting of Delegates from the different Metropolitan Vestries was held on Wednesday, the 12th inst., at St. Martin's Vestry Hall—Mr. GODSON, of St. Mary, Westminster, in the chair—to consider the question of the supply of gas to the metropolis, and to pass resolutions for the purpose of obtaining legislative assistance in reforming various alleged abuses.

The delegates in attendance were:—Mr. Stevens and Mr. Clarke, Westminster; Mr. Grant and Mr. Elt, Islington; Mr. Wood and Mr. Jeffrie, Lambeth; Mr. Perry, Chelsea; Mr. Appleton, Mr. Lamb, and Mr. Tempany, St. Martin's-in-the-Fields; Mr. Dowden, St. George's, Hanover Square; Mr. Waring, St. Giles's-in-the-Fields; Mr. Eldridge, Mr. Farrer, and Mr. Cameron, St. Pancras; and Mr. Price, Newington. There were also present Mr. Beal, the hon. secretary, and Mr. Hughes, the hon. engineer.

The CHAIRMAN, in answer to an inquiry, said he believed the funds in hand amounted to upwards of £500.

Mr. BEAL (the hon. secretary) said: I am extremely desirous that we should consider the question with the resolve to close the parliamentary campaign in the next session. To do this we must have the aid of public opinion and of the press. The existing gas companies having obtained their existing Acts of Parliament on the distinct basis of competition, they have, by a mere private compact amongst themselves, removed that competing basis, and divided the metropolis into separate districts, each to be lighted by one company exclusively. Had Parliament contemplated the possibility of such a monopoly, restrictions would have been imposed, as has been done in all provincial Acts establishing a monopoly of lighting in any district. We therefore ask no more than what would have been granted if the gas companies had gone to Parliament in 1859, as they tried to do in 1849, and boldly asked for a monopoly of London lighting. Recent trials in our county courts prove that a monopoly exists, that gas companies can impose their own terms, and that the public must comply or go without gas. These judges have rightly laid down the law that the gas companies may now impose their own terms, and we therefore seek to compel a supply of gas to consumers at a maximum price to be fixed and accompanied by such regulations as shall protect both parties, and to render null and void certain arbitrary notices and acts by gas companies, such as cutting off gas without notice and charging arrears due by former tenants. This last unjust power is taken from the Imperial Company by their Act, but it exists and is enforced by other companies. We seek also to fix a standard of illuminating power, as is common in all provincial gas Acts, but which is matter of contract in London; and from the ignorance of the public in such matters the companies are allowed to exhibit the wretched lights now burning in the metropolis. We seek to fix the maximum price as the only test. This important point may be thus explained:—If the dividend be limited by Act of Parliament to 10 per cent. on the original capital, it is clear that we must have a thorough investigation of their books in order to settle the amount thereof, and free it from reserve-fund and other items swelling the present capital account. This can only be done through Parliament, and we ask for the same inquiry and the same action that governed the water settlement in 1852, and for certain clauses to protect public local authorities having the care of public lighting of the companies' districts. Scarcely any contract has been made by any parish since these gas companies' districts were formed which has not involved a much higher price, and many companies have notified their intention to retire from public lighting of districts as from Michaelmas and Christmas. As to my own district, St. James's, even their own engineers deposed before Parliament that a maximum of £2. 16s. per public light was fairly remunerative, yet, under more favourable circumstances, we now pay £3. 13s. 6d. St. Margaret's, St. John's, and St. John's parishes have also had important negotiations, not to mention the great battle of St. Luke's, Chelsea, now before the courts, and the disputes of other parishes. Other clauses have reference to the watering of meters and protection against improper registration. Lord Redesdale's bill only approaches, but does not settle this question. The bill we propose to introduce rests its claim for support on grounds over and over again conceded by Parliament—that the private consumer and the public authorities are alike entitled to protection against monopoly in the supply of so necessary an article. One great difficulty is popular ignorance. Men understand as little about gas as they do about a watch. The meter inspector comes, and if you use a wet meter he fills it up with water. You are thereby defrauded, and instances are proved of this system defrauding the consumer to the extent of 60 per cent. At the top of the meter is an orifice to pour water in, and at the side is a screw which gauges the water-line. This should be removed on the meter being filled, and all excess will run out. The absence of this simple attention is a fruitful source of fraud. Another important point is to turn your gas full on at the meter and regulate it at the burner. These two points attended to would seriously alter your gas bills. One fruitful source of complaint is the irregularity of registration with the same number of burners. These remedies would correct the irregularity. The tables issued by our friend Mr. Hughes show an overcharge on the public lights of £50,000 per annum. The organs of the gas companies contend that there is an undercharge of £32,000 per annum. The discrepancy occurs thus:—They take credit for gas to each public light 21,520 feet; but, after the most careful tests, we fail to make it 16,000 feet. The remedy is to burn by meter—say one meter to every tenth lamp—the parish to light and extinguish its own lamps, as in many provincial towns. In fact, we must revise our whole system of parish lighting, or become a prey to the most enormous jobbery. We urge the discussion of this question, and we to-night formally renew our investigations into the present arrangements for the supply of gas to the metropolis. We have not yet received the promised reply of the Home Secretary to the deputation which waited on him last session, and a fresh appeal must be made, as also arrangements for our future proceedings.

The CHAIRMAN moved the first resolution, to the effect that, the Home Secretary having promised the deputation in July last that he would consider the subject, another application should be made to him.

Mr. WARREN said, as the objects of the delegates had been thrown over last session in consequence of their not having given timely notice of their intention to bring in a bill, it was a matter of immediate consideration what steps they should take to insure a better fate for the bill now contemplated. The parliamentary agent they had employed had done nothing whatever. He should propose that no specific instructions be given to the next agent whom they might employ, but that he be generally directed to do all that was necessary to bring the bill before Parliament.

After some further discussion the resolution was put and carried, as were others authorizing the secretary to take certain steps in accordance with the objects of the meeting.

Mr. HUGHES (the hon. engineer) read his report, as follows:—

The importance of clause 34 in the proposed Metropolis Gas Regulation Bill, fixing a maximum price for the whole metropolis, will be more clearly seen when we consider the variety of price which prevails at present. It is commonly understood that two distinct kinds of gas are at present supplied to the metropolis—namely, cannel gas at 6s., and common gas at 4s. 6d. per 1000 feet. Cannel gas is sold at 6s. wherever it is supplied in the metropolis, and its illuminating power is such that a 5-feet batswing burner gives a light equal to 24 or 26 sperm candles. The common coal gas, which at the present time has an illuminating power equal to half that of the cannel gas, varies considerably in price, being sold at 5s. 6d. and 6s. in parts of Wandsworth; at 5s. in part of Lambeth, Lewisham, and another part of Wandsworth; at 4s. 9d. in Woolwich; and at 4s. in Mile-End, Limehouse, Poplar, Whitechapel, the whole of the City of London, and part of Clerkenwell. Thus we have within the metropolis the prices for common gas ranging from 4s. to 6s; nor is this the whole difference, for in all those districts where the 4s. price prevails no meter-rent is charged, while in the districts where the price exceeds 4s. a meter-rent is charged in addition to the price of gas. Now, the meter-rent cannot be estimated at less than 4d. per 1000 feet, so that the prices really range from 3s. 8d. to 6s. It will require little argument to prove that such an enormous difference as this should not exist amongst different parts of the metropolis.

There is another example of inequality in price which is worth noticing. In many of our provincial towns the gas companies are in the habit of allowing considerable discounts to large consumers of gas. These discounts amount in some cases to as much as 25 and even 30 per cent. Now, the gas companies in London profess to allow no discounts, however large the consumption. Without, however, entering into the question whether such discounts are politic or otherwise, the fact is certain, and has been recently ascertained, that there is one large class of consumers who do, in fact, obtain a considerable allowance or discount from the amount of their gas bills. These are the railway companies, some of whom annually consume as much as 10,000,000 or 12,000,000 feet of gas at their metropolitan stations, and they are favoured by the gas companies to the extent of 6d. per 1000 feet, or more than 10 per cent. reduction in the price of their gas. In other words, the railway companies obtain their gas for 4s. per 1000 in districts where the private consumer pays 4s. 6d.

It will, perhaps, be worth inquiring on a future occasion as to how far this amiable conduct of the gas companies towards their powerful customers who rule the destinies of the travelling world is influenced by the consideration that these customers could very easily make their own gas, and would probably set about doing so if they were not propitiated by a comparatively low price. The circumstance that this large discount is allowed to certain parties who consume gas is an important fact to be borne in mind by the local authorities when seeking to make contracts for the supply of gas by meter to the public lamps. The following are instances of the low price charged to the private consumer:—Belfast, 4s. 2d. to 3s. 4d.; Birmingham, 4s. to 3s.; Blackburn, 4s. to 3s. 9d.; Bolton, 5s. to 4s.; Bradford, 4s.; Bristol, 4s. to 3s. 9d.; Cardiff, 4s. 3d. to 3s. 6d.; Carlisle, 4s. 2d.; Derby, 3s. 9d. to 3s. 1½d.; Halifax, 4s.; Liverpool, 3s. 9d.; Macclesfield, 4s. 6d. to 3s. 9d.; Plymouth, 4s.; Preston, 4s. 9½d. to 3s. 4d.; Rochdale, 4s.; Sheffield, 4s. to 3s. 6d.; Walsall, 3s. 4d. to 2s. 10d.; Whitehaven, 2s. 6d. to 2s. Now, few of the above towns are more favourably situated than London with respect to the cost of raw material for gas making. If the coal in some of them costs a few shillings per ton less, the value of the coke and other residual products is also less; so that the absolute cost of raw material assimilates much more than would be supposed at first sight.

Whenever the question of price is discussed with a gas company, or any of their innumerable and active agents, one of the commonest and most trite of the arguments made use of is to this effect, that the price of coals is so much higher in London that gas companies are obliged to charge a much greater price for gas than in places where the coal is cheaper. Let us examine this argument for a moment.

A very extensive analysis of the accounts issued to their shareholders by the London gas companies during the last five years has shown that the price of raw material for gas making in London has varied from about 7d. to 15d. per 1000 feet, the average price for all the companies during the last five years being about 10d. This is the absolute price which raw material has cost them after deducting the sums received for the sale of coke, tar, and other residual products.

Now the question becomes, how much of this 10d. will, or can, be saved in any place, however favourably situated with respect to the supply of coal. A close examination of the prices paid for coal, and of the prices realized for residual products, will show that in few places, even at the pit's mouth, can gas be made at a less cost than 4d. per 1000 feet for raw material, so that it is difficult as an extreme case to conceive any place in which gas, owing to the relative prices of raw material, should be 6d. per 1000 feet less than in London, yet in a large proportion of the towns above mentioned the gas is considerably more than 6d. below the London price. Consider for a moment the cases of Walsall and Whitehaven, with gas at 2s. 10d. and 2s. per 1000 feet. In the latter place there are two companies, one supplying at 2s., and the other at 2s. 6d. Now, supposing for a moment that the raw material in Whitehaven costs absolutely nothing—namely, that coal is so cheap, and the residual products so valuable, that the one balances the other, then it is quite clear, if the company can afford to sell at 2s. per 1000, that this 2s. covers all the other expenses, including labour, materials, leakage, and profit on capital. The question naturally arises, "If 2s. per 1000 will cover all these charges in Whitehaven, why not in London?" According to the example of this town, is it not clear that the price in London should not exceed 10d. for coal plus 2s. for all other charges, making on the whole 2s. 10d., or, to be liberal, 3s. per 1000. When we come to examine into the reasons why 3s. per 1000 feet will not pay in London, we find the question complicated with many difficulties, and one of the most prominent and remarkable of these is the enormous amount of capital which has been recklessly and wastefully expended on most of the London works. Is it fair that the interest on this excessive, and, in many cases, unnecessary and extravagant outlay, is to be charged for ever upon the trade and industry of the metropolis? If this proposition can be maintained in the affirmative, it is one which at all events derives no support from the analogous cases of canals, railways, and other undertakings of a similar character. Granted in these cases an excessive expenditure of original capital, the shareholders must, and do, suffer in proportion, and not the public. When the Legislature shall take the pains to understand this subject, and view it in a proper light, it may be hoped that the gas companies will not be exempted from this invariable law, affecting every enterprise both public and private.

It will exceed the limits of this paper to enter at the present time upon the vast anomalies presented by the capital accounts of the various London gas companies. This must be reserved for a future occasion. There are some facts connected with the history of gas lighting during the last thirty years which will serve to show the extreme improbability that the public will ever be relieved by any reduction in price, now that the well-understood monopoly of lighting has been constituted by the companies themselves. In the year 1829 gas was sold in London at 15s. per 1000, and the gas at this enormous price was so impure that I have seen test papers which had been preserved from that date coloured and stained as black as ink, owing to the presence of sulphuretted hydrogen. At the present day, gas is sold in the City of London at 4s. per 1000, without meter-rent, and is so pure that scarcely a trace of sulphuretted hydrogen can be detected in it, and the test papers used for detecting this impurity are rarely discoloured in the slightest degree. Now, it must be observed that the successive reduction of price from 15s. to 4s. has been almost entirely due to competition. The gas companies in 1829 were as loud in their asseverations as they are at present, and their assertions were then just as confident and bold as they are now, that any reduction in price was impossible. Events have shown, however, that a very large reduction was possible; that at the same time a vast improvement in quality has been effected; and, lastly, however strange it may appear, the dividends of the gas companies have, in all probability, increased at the very same time that the public were reaping these great advantages. Observe how small is the inducement for a monopolist, under any circumstances, to make a reduction in price, when left to his own free will. Suppose a monopolist to derive a certain revenue from the sale of an article, and suppose a very large reduction of price—one which would immensely benefit the public—should affect his net income to the smallest amount, will the monopolist make this sacrifice of the infinitesimal sum to produce an enormous amount of public good? The experience of monopoly in all ages answers, "No." To put the case more clearly in figures:—Suppose a monopolist charge £1000 a year for the sale of an article, and suppose he were to reduce the price one half, the increased sale making up the same, or nearly the same, profit as before the reduction—here the gain to the public would be enormous, the loss to the monopolist extremely small; but will the monopolist take on himself this trifling loss—a loss which may be only temporary—to effect the greatest public good? The answer must again be in the negative.

On the other hand, it must be observed that under a system of competition prices will adjust themselves within much narrower limits, and in many an instance the public benefits by large concessions which, after all, are very slightly injurious to those who make them. In the present gas supply of London, all this protection from competition is gone; the whole trade of gas supply is a close monopoly, and woe to the public welfare unless some stringent checks are imposed on the gas companies. Amongst the most moderate of these checks is that of a maximum price, which it has been proposed hitherto to fix at 4s. 6d. for common gas throughout the metropolis. Already, however, this price is considered too high in many large districts, and, indeed, the more the question is probed and examined, the more it becomes evident that a price of 4s. would pay a very handsome dividend upon a liberally expended capital. Should this question, either from design or misfortune, be postponed for some years, I venture to predict that the terms now fairly offered to the gas companies on the part of the public will be couched in no such liberal spirit as that by which they are now distinguished, and the gas companies may wish in vain for the moderate compromise proposed in 1858, and embodied in the Metropolis Gas Regulation Bill of last session.

Mr. DOWDEN moved a resolution that the maximum price be fixed at 4s.

The CHAIRMAN suggested that it would be better to see the Home Secretary before fixing any maximum price at all.

Mr. PRICE was not desirous of leaving too much for the Home Secretary's decision. The companies had refused to enter into the proposed compromise of 4s. 6d., and they were now free to make a fresh proposition.

Mr. ELDRIDGE said there were only two courses—either to have one maximum price for the whole of the metropolis, or to divide the central districts and the suburbs, charging the latter with a certain extra sum. He thought to do this would be to divide themselves. He concurred with the spirit of Mr. Dowden's resolution, but seeing no reasonable chance of gaining the desired end, he must oppose the motion.

Mr. WARREN said he saw no objection at least to having the 4s. put in the bill. It was very clear that the point would be one for consideration in committee. The gas companies had refused the compromise offered them, and it was no longer necessary to hold out any inducement.

The SECRETARY said that Mr. Dowden had done great service by calling attention to matters involved in the question of a maximum price, but that it was hardly desirable to come to a decision at present. He would suggest that, as several parishes were not represented, and as opinion was so nearly equal on the subject, they should postpone the discussion.

Mr. DOWDEN withdrew his motion, stating his intention to take the sense of the delegates on the question before the opening of Parliament.

The proceedings closed with a vote of thanks to the chairman.

---

WESTMINSTER DISTRICT BOARD OF WORKS.

The Ordinary Meeting of the Board was held at the Offices, Great Smith Street, on Friday, the 14th inst.—Mr. NORRIS in the chair.

After the transaction of some routine business, the board proceeded to deal with the subject of the

*Public Lighting of the District.*

Mr. JEBB, the clerk, read a report of the committee of works with reference to interview with the Chartered Gas Company on the subject of their proposal for lighting the public lamps in this district from and after Christmas next, and also referring to the communication addressed to the Equitable Gas Company on the subject of their proposal for lighting a portion of the district. The report stated that pursuant to the instructions of the board of the 9th of September, they had obtained an interview with the directors of the Chartered Gas Company, and discussed with them the objections of the board to the clauses proposed by the company to be inserted in any new contract for the public lights. They explained to the directors that as to clause 1, which related to the term of the contract, the board offered no objection. In reference to clause 2, by which the company sought power to open the ground for laying down or repairing mains without permission of the board, the committee urged that the clause in the present contract was adequate, and gave the company every facility for carrying on their works, and that the board could give no other permission than that which they were empowered to do by the Metropolis Local Management Act. The deputy-chairman stated to the committee that the directors had fully considered this subject, and having been put to great inconvenience and expense in consequence of the refusal of the board to allow the company to lay new mains to their gasholder recently erected in Holywell Street, they desired to protect themselves in future by the insertion of this clause. They, therefore, declined to alter their proposal. The deputy-chairman also alluded to another case in which the late Paving Commissioners had compelled the company to pay £150 before they were allowed to lay a main in Holland Street to a gasholder on the opposite side of the way. The committee saw no objection to the third proposition, which was, that the burners should be lighted and extinguished by the company as heretofore, and as to the time for commencing and extinguishing the lamps. They availed themselves, however, of the opportunity afforded in discussing this clause in connexion with clause 5 as to price, &c. (in case the company should insist on that clause) to urge that the board should be allowed to light their own lamps, the gas being supplied to them by the company by meter, and they referred to various towns in the provinces, and to districts in the metropolis, where such a course was adopted. The deputy-chairman informed the committee that the directors could not entertain the proposition. As to the 5th clause itself, the committee urged that the price proposed to be charged was an increase on the last contract, inasmuch as it was at the rate of 7s. 9d. per 1000 feet, exclusive of the cost of lighting and repairs to lamps, whereas the charge to private consumers was only 6s. per 1000 feet. This conclusion was arrived at by taking the required consumption to obtain a light equal to 10 sperm candles at 2·1 feet of gas per hour. They also urged that the quantity of feet and quality of gas to be supplied should be inserted as in the present contract. The deputy-chairman said the directors denied the premises on which the basis of the charge was attempted to be made, and referred to misstatements contained in a report issued by the board on this subject, and said that the directors declined to alter their proposition. The committee rejoined, that the pamphlet alluded to had nothing whatever to do with the question at issue. In reference to clause 7, which required that no penalty should be inflicted for accidents, strikes, or causes over which the company had no control, the committee urged that this clause was most arbitrary, and might prevent any penalty being inflicted on the company for non-performance of their contract, and that a clause similar to the one in the present contract, to which the board were willing to agree, was sufficient for the protection of the company. The deputy-chairman said the directors must insist on this clause, and stated as a reason the inconvenience occasioned to them by strikes among their workmen already, and which might again arise. They therefore declined to alter their proposal in this respect. The committee stated that the board were willing to modify the penal clauses, and the deputy-chairman said the directors would consider the subject, and communicate with the board. After stating at length the result of their interview, the committee reported that they subsequently received a letter from the secretary of the company, requesting a further interview with them in reference to the question of the supply of gas by meter to the public lamps. This interview took place on the 27th of September, when, after some discussion, the directors expressed their willingness to supply the gas by meter at the same price as to private consumers, the board undertaking to lay down meters and light the lamps at their own expense. The directors, however, raised some objection to the proportion of meters which was suggested—viz., one meter to every twelfth lamp, but offered no objection provided a meter were fixed to each lamp. At one part of the conversation the deputy-chairman said he considered that separate mains would be necessary in case of the lamps being supplied by meter; but this subject of separate mains was not alluded to in a letter received from the company on the 11th instant.

Mr. ROGERS thought there was a little inaccuracy in the report. The suggestion of the company was not that there should be a new main provided if it was intended to have a meter to each lamp, but only in the event of there not being a meter to each lamp a separate main would be necessary.

Mr. HUGHES said no doubt that was correct, but the fact was, he considered the suggestion of the company about a separate main was thrown out as such an evident bugbear to frighten the board, and was so absurd in itself, that he had paid no attention to it. It seemed to him a perfect mockery and an insult to them to propose such a thing, and was put in such a way as to intimate that they had no power or choice in the matter at all. It was quite possible the distinction was drawn that, if they had a meter to every lamp, the company would consent to light them, but if not they must have a separate main, and then one meter might do for a number of streets. But the proposition was altogether absurd—as if it could be supposed that the board were likely to lay down a new main at an expense of some £500 per mile.

After some conversation, in which Mr. PENN, Mr. HORNE, and others took part, the committee expunged from their report the words in the last paragraph—"in case of the lamps being supplied by meter."

Mr. HUGHES rose to propose a resolution. He said he thought they had in the report of the committee in reference to their interview with the gas company, a very full exemplification of the effects of the monopoly which had been created. Here was the Chartered Company, in their communication with the board, refusing to yield to them on a single point, declining even to supply the public lamps if they were to be prevented breaking up the public streets whenever they wished, thus taking from the board the powers with which they were invested by the Act of Parliament. The company would not even stipulate to give a certain number of feet of gas to the public lamps; they refused to state the quantity of the gas supplied, and asked the board to be satisfied with 10-candle lights, without affording the smallest means for testing the quality of the light or the quantity of gas passing through the burner. They proposed to give 10 candles only, and he thought the committee clearly showed to the company at both their interviews that their proposition was actually equivalent to giving only 2 feet

of gas per hour, at which rate the board would positively have to pay 8s. per 1000 feet for the public lamps, while, at the same time, the private consumer was being supplied at 6s. per 1000. He would ask any impartial person if that was a fair and reasonable proposition for the local authorities to entertain? Let them just observe how the figures stood. The company's former contract was to give 2½ feet to each lamp per hour for £4. 7s. 6d. per annum. Their present proposition was 2 feet per hour for £4. 5s. per annum. Deduct from 85s. the cost of lighting, cleaning, and repairing, would leave 72s., the price paid for the gas, so that, the quantity consumed being only 9000 feet per year, the charge per 1000 for the gas was 8s. Their proposition seemed somewhat modified at the last interview, for they then professed themselves willing to withdraw their refusal to supply the public lamps by meter. They were prepared to do it, but upon what condition? That the board should put a meter to every lamp! This was a most extravagant proposition; but even assuming that it were accepted, the board were not to have their gas at less than what the private consumers paid. Now, he (Mr. Hughes) was prepared to state that, on an average of all towns in England, Scotland, and America, the public lamps were lighted by contract at prices equal only to three-fourths of what the private consumer paid, or at a discount of 25 per cent. That discount in many cases was exceeded, and in many towns, such as Dover, Coventry, &c., the public lamps were lighted at half the price. He did not, however, ask for anything so extravagant; he would take a mean course, and seek only for a rate which was an average of the towns which had been examined for the purpose. It was most reasonable to require to be supplied at three-fourths of the price charged to private consumers, which in this case would be 4s. 6d. instead of 6s.

Mr. GODSON: Do you speak of cannel gas?

Mr. HUGHES said he did, and the price of that gas to private consumers was 6s. per 1000. If it was to be understood that the company were willing to supply by meter, he was prepared with a resolution on the subject which would bring the matter to an issue. He would move "That a definite proposition be made to the company to the following effect—The consumption of gas to be ascertained by means of one meter, to be affixed by the board to every twelfth lamp, and that the price to be paid per 1000 feet be referred to arbitration in the manner prescribed by the Lands Clauses Consolidation Act." This he thought was a fair proposition, and was in accordance with the practice which prevailed in every town in England with reference to arbitration where there was an Improvement Act, and also in every town in Scotland which had a Police Act. It was not to be supposed that the Chartered Company, without some proposition of this kind, would agree to the terms of the board, and therefore, unless the latter were prepared to accept the terms offered by the company, there was no other course open. There might be an opinion amongst members of the board that it would be better to accept the terms of the company, of course under protest, because it was clear they could not compel the company to agree with the board, nor had the board any power to go to another company for a supply, there being an entire monopoly.

Mr. PENN seconded the motion.

Mr. CLARKE inquired the number of public lamps in the two parishes which were lighted by the Chartered Company?

The CHAIRMAN: Eight hundred and forty.

Mr. CLARKE: In that case, if Mr. Hughes's motion were adopted, there would be seventy meters required. I beg to ask the surveyor what, in his opinion, would be the probable cost of each meter, including the fixing, &c.?

Mr. ARNTZ: I am not in a position to answer that question, but at a rough guess I should suppose about 20s. or 25s. each.

Mr. CLARKE believed the company would not undertake to find meters unless they were allowed to charge meter-rent. But none of these things had been inquired into, and, therefore, to accept such a definite proposal as that now before the board was to a considerable extent going blindfold. Not only would this vast outlay be incurred, but the board must remember that it was sought to be done on an assumption that the company would agree to that which they had already declined and refused to do. Would the board have confidence enough to go and ask them again? Surely, his friend, Mr. Hughes, must be a little at sea. The company knew for certain that they had the board in their power and could do just as they pleased. It was, therefore, a very unsatisfactory proposal for the board to adopt, without knowing precisely the outlay to be incurred, or the probability of saving to be obtained, even should the company consent.

Mr. GODSON: What is your remedy then?

Mr. CLARKE: Not the supply by meter. Nothing is more unfair than the present supply of gas in that way.

Mr. HUGHES: The meters will all be correct now that the Act of Parliament has passed. It is only a question of some £100 or so for meters.

Mr. CLARKE: It is quite evident that if the company agree we shall only be supplied on the same terms as private consumers, and we shall have all the expense of lighting and repairing our own lamps; so that, whether we pay 4s. 6d. or 6s., the additional cost will be very great.

Mr. HORNE said Mr. Hughes commenced his remarks by stating that the board now felt the effects of the monopoly which had been created. But he would ask any member of the board whether, since the combination among the gas companies, any additional charge had been made to the private consumers in the district, and whether the public lamps were not now lighted at less than formerly? This was a question, however, which he, perhaps, had better leave to Mr. Hughes, with his extraordinary figures, to answer, and go at once to the subject of meters. It was proposed by the resolution now before the board to put one meter to every twelfth lamp. But what would be the effect? Supposing that, by some cause or other, the twelfth lamp meter showed a considerably less consumption of gas than was consumed at the other eleven, or *vice versâ*,—the board in the one case, or the company in the other, were liable to be very much imposed upon. He, for one, saw no better mode than that of treating each lamp as a private consumer, and having a meter to each; in that way only could they know what they were consuming. Much had been said about the public lamps in provincial towns being supplied so remarkably cheap. But, supposing this board had now the power, or could obtain it by Act of Parliament, to coerce the gas company to light the public lamps for nothing, let them ask themselves who would have to pay for it? Why the private consumers, of course. There was not a town in the provinces, where the public lamps were lighted at a low rate, in which the private consumers did not pay for it. Why, they had an illustration of that in Marylebone. The other day, a certain public company paid the vestry a bribe to carry a pipe through a certain district. Who paid the bribe? Not the company, but the private consumers. He (Mr. Horne) had never attended a meeting of this board in which the gas question was not brought up. Surely, there must be some private interest at work to keep alive this agitation. (No, no.)

The CHAIRMAN: We are all interested as consumers.

Mr. HORNE trusted there was no private interest at work. He only knew that, during the five years he had attended the board, this gas question, in some form or other, was continually being brought up. He certainly thought that, before they took the strong ground they had done, they ought to understand something more of the working of the "monopoly." Mr. Hughes, in his evidence before the House of Commons, said that, if fairly carried out, the private consumer and the public had a right to expect a cheaper rate for gas by reason of the monopoly. (Mr. Hughes: Hear, hear.) Well, then, let them give the company time to carry this system into operation, and then, perhaps, they would be supplied with gas at a lower price than they were at present. On the question of meters to the public lamps, he thought the board would do wrong to pass this resolution.

The CHAIRMAN: It is not for me, as chairman, to give an opinion, but I certainly recommend to the board to pause before passing this resolution.

Mr. GODSON said, if they did not do something now, what were they to do hereafter? Could any gentleman present chalk out some other line for the board to take? He asked this question because there were many persons present far more conversant with gas matters than he was. Were they at once to submit to the arbitrary rules laid down by the gas company, without some attempt to modify them?

The CHAIRMAN said, what he was going to suggest was, whether it would not be better to postpone the question for a week, to enable the clerk to communicate with the Chartered Company, and ascertain what they would light the parishes for by agreement, and not by contract at all. He could not help reminding the board that if the present resolution passed, they would incur great expense in providing meters, in hiring lamplighters, and providing a person to look over them. They would thus be creating a very responsible office, and such a proposal, therefore, required grave consideration.

Mr. HUGHES: The gas company in their last letter consented to supply by meter if the quantity consumed could be ascertained satisfactorily.

Mr. HARTLEY: The only way to contend with monopoly is to start another company.

Mr. HUGHES proceeded to reply to Mr. Clarke's observation as to the cost of lighting and repairing the lamps. The estimate of the gas companies, he said, was 15s. per annum for each lamp, as the cost of lighting, extinguishing, and repairing; and he was prepared to show that at Huddersfield—and he took it from the evidence of the town-clerk himself—all these services had been recently let by contract at 9s. per lamp. That being so, was it not evident that if the board took the lighting into their own hands they could effect a considerable saving on the 15s.? and there were plenty of people willing to take the contract. Then, with reference to the price to private consumers, to which Mr. Horne had alluded, it was the old bugbear again. It had always been said, "You must not seek to have the public lighting too low; if you do, the private consumers will suffer." He (Mr. Hughes) would like to know of a single instance in which the private consumer had been affected by the price charged for the public lamps. He would venture to say that no such instance could be adduced; while, on the other hand, numerous cases could be brought forward in which a high price was charged for the public lighting without any benefit at all accruing to the private consumer. It was a great delusion to suppose that it would be otherwise. The gas companies always tried to get as much as possible out of the public authorities, while they gave no corresponding advantages to their other customers. Was it imagined by any one that if the board paid double the price now asked, the company would reduce their price to the ratepayers individually? Then, again, were there not a large number of ratepayers who were not gas consumers at all? The very poorest, as well as the very richest, inhabitants of the parishes burned no gas in their houses, and yet they were immensely interested in this question of the public contract. Of course those who formed the middle stratum of society, the tradespeople, had a double interest as consumers and ratepayers; but every one in the district was interested in the latter character. In these parishes, at the present time, they were paying 5d. in the pound for a lighting-rate, and therefore the question was one of no ordinary importance. Then with regard to the objection to have one meter to every twelfth lamp, there were doubtless some members of the board who were acquainted with the working of the experimental meter by which the consumption of gas per hour was ascertained by the registration per minute. All gas men were familiar with that mode of ascertaining consumption. By the present proposition he was not asking for one meter is sixty lamps, which would be equivalent to taking the consumption of sixty minutes by the registration of one, but that which was five times as good a test—viz., 1 in 12. He could quote numerous instances in which this was done, but would only refer to Leicester, where there was only one meter to every seventy lamps; and yet the local authorities, as well as the gas company, were satisfied with the result. There were also towns lighted by contractors at this moment where the same principle prevailed. He had information from St. Ives, where the supply of gas was in the hands of a contractor, who had agreed with the authorities of the town for one meter in twelve, and was perfectly satisfied with the arrangement. In their last letter, the Chartered Company said, "The directors of the company express no objection thereto, provided the company are not put to any expense, and the quantity of gas can be ascertained to the satisfaction of the court." That might mean that they would not even be satisfied with a meter to each lamp. The board, then, ought to get a definite answer to their proposition, that they might know what to be about, and in no case could their position be otherwise than strengthened by adopting the resolution. He conscientiously believed that this was the proper way to deal with the question, and he was satisfied, from a long investigation of the subject, that this system worked better than any other. He was acquainted with the working of every town in England, Scotland, and Wales, as well as in America, and knew that this was the best way of arranging for lighting the public lamps.

Mr. HORNE said Mr. Hughes had challenged him to give an instance of a town in which the private consumer was made to pay for the low price charged to the public lamps. In reply, he would refer to Dover, where the public lamps were charged 2s. 6d. per 1000, and the private consumer had to pay 5s. 10d. He might also mention Bilston, which was in the centre of the coal district. There the public lamps were charged 3s. 10d., but the private consumer paid 5s. 6d. per 1000.

Mr. CLARKE said he should like to ask Mr. Horne whether the price of gas ever varied in those towns, and whether there was any increase to private consumers where there were no public lamps?

Mr. HORNE said he was aware that many gas companies would drive mains through a district, and charge less for public lights, for the sake of obtaining the private consumers there.

The motion was then put and carried, there appearing, for the motion, 10; against it, 5: majority, 5—two members of the board and the chairman not voting.

Mr. HUGHES then moved—"That the clerk or solicitor be directed to

communicate the above resolution to the company, and that the subject relative to lighting the district be adjourned to this day week, at four o'clock."

Mr. DOUGHTY seconded the resolution.

Mr. CLARKE said he thought the board must insist upon some restriction being put upon the company, to prevent their having the streets under their control; otherwise, he should object to entering into a contract with them at all. He would sooner be without their gas than have them breaking up the streets whenever they thought proper.

The motion was then adopted.

The committee of works reported that they had received no communication from the Equitable Gas Company, in reply to their letter on the subject of the company's proposal to light a portion of the district.

The CLERK stated that a further letter had been sent to the company, requesting a reply by the 14th inst. To that the secretary had answered that, in consequence of the absence of some members of his board from town, he had not been able to get a decision.

At the suggestion of the CHAIRMAN, it was agreed that this matter should also stand over for a week.

The CLERK stated that the committee had ascertained that it would be necessary to advertise for tenders for the public lights, giving fourteen days' notice of the intention of the board to receive them. He also read the advertisement which the committee had prepared to submit to the board.

Mr. HUGHES inquired whether the particulars of lighting referred to in the advertisement were such as to enable persons desirous of tendering, to know whether they applied to oil or paraffine as well as to gas? He thought it should be thrown perfectly open.

Mr. CLARKE: Oh yes; anything.

The advertisement was then amended by introducing the words, "oil, paraffine, or other material."

Mr. HORNE: Before you put the resolution, ought you not to consider whether you really could light the public lamps with paraffine or oil?

The CHAIRMAN: That would be for those who sent in the contract to consider.

Mr. HORNE: No, because we should have to provide the lamps for it. We ought to avoid being made a laughing-stock of.

The advertisement was then agreed to.

The CLERK read the surveyor's report, recording result of photometrical experiments made by him upon the illuminating power of the Chartered Company's gas during the month of September. It stated that the standard and experiments being the same as before, the illuminating power of the ordinary coal gas was 12·76, and the cannel coal gas 13·69 candles.

*Metropolis Gas Regulation Bill.*

The CLERK read a letter from Mr. Beal, honorary secretary, to the delegates, with copy report and proceedings of the select committee on gas (metropolis); also, with copy circulars on the subject of metropolis gas, and public lighting in the metropolis and provinces.

Mr. ROGERS (solicitor to the board) said: Mr. Beal, in order to induce the metropolitan vestries to subscribe further sums of money to aid them in bringing in another bill, states in his circular that "The vestry of St. James, Westminster (originally contributing £10, and again £100), have now made a further contribution of £100 towards the fund for the next session; and it is hoped that other vestries and boards will not be slow in following so good an example." (Laughter.) He then proceeds to say that "Some doubts have arisen as to the powers of vestries to contribute towards a general fund for parliamentary expenses, in consequence of a legal opinion published and distributed in the interest of the gas companies, in contradiction of that obtained by the delegates from Mr. Pashley." Now, sir, that statement is not true, because this board is perfectly aware that they themselves took an opinion, which was certainly not at the instigation nor "in the interest of the gas companies." They took the opinion of Mr. Keene, who advised that it was an illegal application of the money entrusted to their charge. Mr. Beal knows that Islington also took an opinion as well as Pancras and Marylebone, which were to the same effect. I believe he knows too that his own parish, St. James's, were advised that it was illegal. Then he goes on—"Should your vestry or board be inclined to the more cautious policy, I invite you to vote a sum of money to a committee of your board, with power to expend the same in furtherance of the reduction of the charges for public lighting, and to depute some gentlemen (if you have not already done so) to meet the representatives of other parishes to arrange the legal expenditure of such sums by your committee." Now that is one way in which he advises the board to cheat the parish. (No, no.) Yes, sir, pardon me, he says—"inasmuch as you are advised that you cannot legally appropriate the funds for this object in a direct way, I will show you how it may be done in an indirect manner," and I say that that is one way of cheating the parish.

Mr. GODSON: I think not.

Mr. ROGERS: Your own auditors have disputed the item in your accounts.

Mr. HORNE: It reminds one of Sir Giles Overeach's advice to his son. "Get money, my son, honestly if you can, but get money."

Mr. GODSON said, although the opinions taken on the subject of the legality or illegality of thus appropriating the money of the parish did not run on all fours, they did dove-tail very much together. That the money could be legally so applied he had no hesitation in saying, nor had he any doubt that a committee of the board—such as the nuisance or the works committee—might be deputed to spend a sum of money not exceeding £200. and that such expenditure could not be disputed on appeal. The question now was not whether they should appoint a committee or authorize any existing committee, nor whether they should employ their own solicitor or a parliamentary agent, but it would be a matter for further consideration. All he said was, that it could be legally done, and would be as straightforward as any other business done at the board.

Mr. CLARKE said it was not his intention to make doctors or lawyers agree, and as Mr. Godson and Mr. Rogers differed on this point, he would leave them to settle it amongst themselves. But he had no hesitation in affirming, that if they could not spend the money in a direct way, they should do it in an indirect way, so long as they attained the object they sought. If he thought the bill in Parliament would not be advantageous to the district or to the metropolis at large, he would withhold the funds of the parish as readily as any man; but, having a firm impression that it would pass next session, and would be advantageous to them all, he would say that, whatever the legal opinions about spending the money for that purpose might be, if he could not spend it directly, he was prepared to do it in an indirect way—by any subterfuge whatever—so long as he could get 10 per cent. for his money.

Mr. ROGERS: I referred to the opinion of the Attorney-General.

Mr. GODSON: I mean to say that the opinion of the Attorney-General is on all fours with us.

The conversation then dropped.

FRIDAY, OCTOBER 21.

An adjourned meeting of the board was held this day, for the purpose of receiving the reply of the Chartered Gas Company to the proposal of the board, that the consumption of gas be ascertained by means of one meter, to be fixed to every twelfth lamp; and the price to be paid per 1000 feet be referred to arbitration, in the manner prescribed in the Lands Clauses Consolidation Act; also the reply of the Equitable Gas Company, relative to their proposal, and the particular objections of the company to the terms and conditions of the present contract, and to consider further the subject relative to lighting the district.

Mr. NORRIS was called to the chair, and the clerk read the letter of the Chartered Company, which stated that, in reference to the first point, the directors adhered to their former intimation, and refused the supply in the way proposed; and as to the next point, that they could not consent that the price of the article supplied by them should be settled by any third party. The reply from the Equitable Company was to the effect that the board having issued an advertisement calling for tenders to be sent in by the 4th of November, they were not in a position at their present meeting to discuss any proposition on the subject; but that, by the time appointed, the company would be prepared to submit the terms on which they would consent to supply the public lights in the district.

The CHAIRMAN said the answer of the Chartered Company was just what he expected, after the flat refusal they gave to the deputation which waited upon them.

Mr. GODSON said, as they were not in a position under existing circumstances to proceed with the matter this day, he would give notice that at their next meeting, provided there were no tenders from the paraffin or other companies to light the district, he would move a resolution to the effect that the offer of the Chartered Company of £4. 5s. for each lamp, and the offer of the Equitable Company of £4. 2s. 6d., be accepted; and that it be referred to the solicitor to prepare deeds of contract, which deeds should contain arbitration clauses, and also modifications of the present penal clauses. He would also move that an intimation be given to the companies that the board objected to the terms imposed upon them; but, in consequence of the districting arrangements between the metropolitan companies, the public were left without protection or remedy, and were compelled to accept whatever terms were demanded.

After some conversation on the point,

It was moved by Mr. CLARKE, seconded by Mr. HORNE, and resolved that the question of lighting the district be adjourned until the 4th of November, when the tenders will be received.

## SUPERANNUATION AND SICK FUNDS.

RULES OF THE ***** GASLIGHT AND COKE COMPANY SUPERANNUATION AND SICK FUND.

*Superannuation Fund.*

That a superannuation fund be established, for the benefit of the workmen employed by the company.

That the sum of Fifty Pounds per annum be subscribed by the company, until the fund shall be found sufficient to maintain the object for which it is established.

That all those in the service of the company, who contribute towards this fund, shall be entitled to the benefits resulting therefrom, agreeably to the following regulations:—

That the payment of threepence per week shall entitle the contributor to a pension of ten shillings per week during his life.

That the payment of sixpence per week shall entitle the contributor to a pension of fourteen shillings per week during his life.

That those who may contribute sixpence per week shall not, however, be entitled to receive the larger pension of fourteen shillings per week, until they have subscribed to the fund at least five years.

That every contributor to this fund, who may hereafter leave the company's service, shall be entitled to a return of two-thirds of the amount which he has paid.

That on the death of any workman who has contributed to the fund, and has not received any benefit therefrom, his widow or children shall be entitled to receive three-fourths of the amount subscribed by the deceased.

That no workman shall be entitled to the benefit of the fund until he shall have been employed on the company's works ten years, nor until he shall have attained fifty-five years of age, except in case of an accident, which may incapacitate him from labour of any sort.

That the attainment of fifty-five years of age shall not entitle the subscriber to the benefits of this fund, unless infirmity renders him unfit for work.

That any workman having been in the company's service ten years, who may be injured in the discharge of his duty, and thereby rendered incapable of work, shall be entitled to the immediate benefit of this fund.

That the company, at their own cost and charges, shall find all the necessary books, keep the accounts, and a record of all the transactions of the society.

That the amount contributed by the workmen shall be paid into the savings bank weekly, in the names of two directors and the secretary as trustees.

That the trustees shall, from time to time, as they think fit, invest the amount subscribed in the funds, or some other securities for the benefit of the society.

That should any unforeseen cause dissolve the society, the whole of the amount subscribed by the workmen, then in hand, shall be divided among the survivors, in proportion to the amount paid by each.

*Sick Fund.*

1. That all the workmen employed by the company shall contribute towards a fund for relief during sickness.

2. That those who subscribe threepence per week shall be entitled to twelve shillings per week.

3. That those who subscribe sixpence per week shall be entitled to eighteen shillings per week.

4. That such workmen who may be employed during the winter only, and have not received anything from this fund, shall be entitled to a return of two-thirds of the amount subscribed by them.

5. That contributors of three months' standing be entitled to receive six shillings per week; six months, eight shillings; nine months, ten shillings; twelve months, twelve shillings.

6. That no allowance be continued for a longer period than three months in any one year.

7. That on the death of any subscriber, all the contributors shall pay, in addition to the usual weekly amount, the sum of one shilling each towards the expenses of his funeral, and a further sum of two pounds shall be given from the fund.

8. That on the death of the wife of any subscriber, the sum of sixpence

shall be paid by each contributor, in addition to the usual weekly amount, and twenty shillings shall be given from the fund towards the expenses of the funeral.

9. That any contributor to this fund, who may hereafter be placed on the superannuation fund, may continue to pay the usual weekly sum of threepence, for which he will be entitled to the benefit of Rules 7 and 8, but no other.

---

RULES OF THE ***** GASLIGHT AND COKE COMPANY SICK AND SUPERANNUATION FUND.

01. Every workman employed by the company shall contribute to this fund sixpence per week.

*As to Sickness.*

1. Each member, during sickness which renders him unable to work (as certified by a medical man), shall be entitled to ten shillings per week for the first twelve weeks; five shillings per week for the next twelve weeks; and three shillings per week for the last twelve weeks; and that any member having received the benefit of the above, thirty-six weeks, shall not be entitled to any subsequent benefit, nor to any dividend during the current year.

2. The sickness of any contributor for a less period than thirty-six weeks shall not deprive him of the full benefit of the fund in one year on the recurrence of sickness, which shall be considered as a continuation of the former sickness and allowed for accordingly.

3. Any contributor feigning sickness, or found intoxicated, or from home between eight p.m. and six a.m. during the six summer months, or between six p.m. and six a.m. during the six winter months; or found imposing, or attempting to impose on the fund in any manner, shall, on a resolution to that effect passed by a majority of the contributors at a meeting called for that purpose, be disentitled to any benefit from the fund during the remainder of the then current year, provided that the resolution be confirmed by the superintendent of the station. Every such contributor shall, nevertheless, continue to contribute to the fund during so much of the remainder of the year as he shall be at work for the company.

4. Every contributor, on the death of his wife, shall receive £3 from the fund for funeral expenses.

5. On the death of any member, all the members shall pay sixpence in addition to the usual weekly payment of sixpence; and then the funeral expenses shall be paid by the club, and the balance remaining out of £5 be handed over to the widow or nearest relation previously residing with him.

6. Any member discharged for slackness of work in the spring, shall receive his dividend of the fund then remaining in hand, after first deducting therefrom the sum reserved out of the previous year's fund, and also the balance in hand of the sum voted by the company.

7. Casual workmen, being those employed between one Christmas day and another, shall derive no benefit from the fund, except in cases of sickness, when they will be entitled to the same allowances as the regular workmen.

*As to Superannuations.*

8. There shall be paid out of the fund superannuation allowances of ten shillings per week as follows, viz.:—

| | | |
|---|---|---|
| At the | Station | such allowances. |
| At the | Station | such. |
| At the | Station | such. |

9. No member shall be entitled to the benefit of a superannuation allowance until he shall have been employed on each succeeding Christmas day for more than ten previous years, nor until he shall have attained 60 years of age, and who is not, in the opinion of the superintendent of the station, permanently incapable of work, and who has not previously been declared to be so incapable of work by a majority of the members at a meeting called for the purpose of considering and deciding on the subject. In cases of members meeting with accidents in their duty which may incapacitate them from labour of any sort, the qualifications of age and ten years' service may be dispensed with.

10. No superannuation allowance shall continue to be paid after it shall have been declared by a majority of the contributors at a meeting assembled after due notice to be unnecessary, and such resolution have been confirmed by the superintendent of the station.

11. The secretary of the company shall be treasurer of the fund.

12. The contribution of each station shall be kept separately; and shall be collected and distributed by stewards, who shall be elected annually, one for each station, by and out of the general body of contributors at each station, at a meeting duly called for the purpose in the month of December in each year. Such stewards to be entitled to all the advantages of the fund, but to be free from contributions.

13. The stewards shall collect the various contributions when wages are paid. Any contributor not paying his contribution at the time to be fined threepence, and no workman will be retained by the company whose contributions have been unpaid for four consecutive weeks.

14. Sick and superannuation allowances shall be paid every Friday. Amounts due for fractional parts of a week on commencement to paid on the following Friday.

15. Accounts of receipts and expenditure at each station shall be kept by the stewards, who shall, on every Saturday, forward any balance to, or draw out any balance required from, the superintendent of the station on each Saturday; and the superintendent to do the same with the secretary on Mondays.

16. The only benefit from the fund to which workmen belonging to other sick clubs shall be entitled, shall be burial fees, and superannuation allowances in common with other contributors, and a fixed dividend of twenty shillings every Christmas in lieu of the sick allowance.

17. The sum of £ be subscribed by the company towards the superannuation fund on first January in each year; say £ at ; £ for ; and £ for . Such sum to be added to and form part of the general fund. The board have determined, in case of need, to increase that sum to a certain definite sum already fixed by them.

18. The fund at each station, after the payment of every claim, and after deducting £ at , £ at , and £ at , to meet future claims, if there be so much in hand, shall be divided every Christmas among such of the contributors as are not disqualified by any of these rules and regulations from receiving the same in equal proportions.

19. General meetings of members shall be convened by the stewards when they shall see fit, and also when they are requested to do so in writing by not fewer than ten members. The times of such meetings to be those at which wages are paid, or at such other times as may be more convenient to the members generally, and when the lamplighters can attend. Three days at the least prior to every general meeting a notice, specifying the purpose for which it is convened, shall be put up in some conspicuous part of the works.

20. Members elected on the superannuation fund beyond the number hereby limited shall await in rotation for a vacancy occurring.

21. Such workmen as are employed during the autumn and winter as extra hands shall receive at Christmas their dividends, after deducting therefrom half the sum (viz., threepence per week) they would have contributed during the previous portion of the year which they have not been employed; such latter sum so deducted to be added to the fund, and in no case to exceed the amount of the dividend.

22. Any member discharging himself, or being discharged or sick by reason of any misconduct, or by any sickness brought upon himself, shall be entitled to no benefit nor dividend from this fund.

23. A committee of five members to be appointed every December to consult with the steward. The decision of the steward so advised to be taken upon all points; but in case of dispute an appeal to be made to a general meeting, whose decision, when confirmed by the superintendent, shall be final.

---

GAS IN GERMANY.—The town of Zeitz, near Leipzig, containing 14,000 inhabitants, who are chiefly engaged in calico, cloth, and other manufactures, was last week lighted with gas. The gas-works have been erected of a moderate size at first, but are capable of any future extension; the cost of the whole, including mains, was nearly £5000. The buildings were erected by local builders, and the ironwork for the apparatus was supplied by the Horsley Company, of Tipton; the pipes were manufactured by the West Hartlepool Iron Company, the whole being carried out under the superintendence of Mr. Charles Gandon, assistant to Mr. H. P. Stephenson, of Pall Mall, London.

CONVICTION FOR WASTING WATER.—At the Hyde Petty Sessions, on Monday, Mr. Henry Herdman, publican, Grosvenor Square, Stalybridge, was fined 5s. and costs for wasting the water of the Dukinfield Water-Works Company. The defendant had attached a pipe to his cellar water tap, and the water was being used, without contract, to wash the flags, &c., opposite the defendant's premises.

# Price Current.

## CASTINGS, PER TON.

*Average Weight of Cast-Iron Gas-Pipes, per Yard.*

| 1¼ in. | 2 in. | 2½ in. | 3 in. | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 126 | 149 | 177 | 208 lbs. |

| Retail Prices are 5 to 10 per cent. higher. | London. | Glasgow. | Newcastle. | Wales. | Yorkshire, Derbyshire, and Staffordsh. |
|---|---|---|---|---|---|
| | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| Pig Iron, No. 1 | 3 15 0 | 2 12 6 | 3 5 0 | 3 5 0 | 3 10 0 |
| 1¼ and 2 inches Socket-Pipes | 7 0 0 | 6 0 0 | 6 5 0 | 6 10 0 | 6 15 0 |
| 2½ and 3 „ „ | 6 10 0 | 5 10 0 | 5 15 0 | 6 0 0 | 6 5 0 |
| 4 and 5 „ „ | 6 0 0 | 5 0 0 | 5 5 0 | 5 10 0 | 5 15 0 |
| 6 in. and upwards „ | 5 15 0 | 4 15 0 | 5 0 0 | 5 5 0 | 5 10 0 |
| Retorts, 1st fusion, hot blast | 5 10 0 | 4 10 0 | 4 15 0 | 5 0 0 | 5 5 0 |
| „ 2nd „ cold „ | 6 10 0 | 5 5 0 | 5 10 0 | 6 0 0 | 6 5 0 |
| Tank Plates, ¼ thick and above | 6 0 0 | 5 0 0 | 5 5 0 | 5 10 0 | 5 10 0 |

## WROUGHT-IRON TUBING,

*Subject to 40 per cent. Discount.*

| | 2 in. | 1½ in. | 1¼ in. | 1 in. | ¾ in. | ½ in. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Patent Welded Tubes, from 2 to 12 ft., perft. | 1 8 | 1 0 | 0 10 | 0 7 | 0 5 | 0 4½ |
| „ „ „ 6 in. to 18 in., each | 3 0 | 2 0 | 1 9 | 1 3 | 1 0 | 0 9 |
| Connecting-Pieces, or Long Screws | 3 6 | 2 3 | 2 0 | 1 6 | 1 2 | 0 11 |
| Bends, Springs, and Elbows—wrought iron | 3 9 | 2 3 | 1 9 | 1 0 | 0 10 | 0 8 |
| Tees, wrought or cast | 4 0 | 2 6 | 2 0 | 1 6 | 1 1 | 0 10 |
| Crosses, wrought or cast | 4 6 | 3 0 | 2 6 | 2 0 | 1 6 | 1 2 |
| Iron Cocks | 17 6 | 9 6 | 7 6 | 4 6 | 3 3 | 2 6 |
| „ with brass plug | 28 0 | 16 0 | 13 0 | 7 0 | 5 6 | 4 6 |
| Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples | 1 3 | 0 9 | 0 8 | 0 6 | 0 5 | 0 4 |
| Syphons, 2 quart | 1 0 | 0 8 | 0 7 | 0 5 | 0 4 | 0 3 |
| | 15 0 | 14 0 | 13 6 | 13 0 | 12 0 | — |

## COALS, PER TON.

| *Newcastle.—Unscreened.* | 6s. 3d. | *Scotch Cannel.* | 45s. 0d. |
|---|---|---|---|
| Whitwell Primrose | | Boghead, at Leith | |
| Medomsley, Eighton Moor, and Burnhope | 6 6 | Kirkness, best | 23 0 |
| Pelaw | 6 9 | Capeldrae, 1st quality | 20 0 |
| New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth | 7 0 | „ 2nd „ | 12 6 |
| Pelton | 7 9 | Lesmahago, at Glasgow | 25 0 |
| Ramsay's Newcastle Cannel | 16 0 | „ „ Leith | 27 6 |
| | | Arniston | 22 0 |
| | | Wemyss | 20 0 |
| | | Knightswood | 18 0 |
| | | Pirnie | 15 0 |

## SUNDRIES.

| | | | |
|---|---|---|---|
| Best Newcastle Fire-bricks | per 1000 | 50s. 0d. | |
| Cliff's Fire-bricks, at Wortley | per 1000 | 57 6 | |
| Ingham's Fire-bricks, at Wortley | „ | 55 0 | |
| Fire-clay Retorts | per foot run, 5s. 6d. to | 7 0 | |
| Tough Cake Copper ... per ton | £107 10s. | Foreign Spelter ... per ton | £20 17 6 |
| English Pig Lead ... „ | 21 15 | English Block Tin ... „ | 136 0 0 |
| Welch Bar Iron, in London „ | 6 15 0 | Banca ... „ | 142 0 0 |
| Tarred Rope Yarn | | per cwt. | 26s. 0d. |

## FREIGHTS.

| *Coastwise—Newcastle.—Per Ton.* | 5s. 9d. | *Foreign.—Per Keel.* | £8 0 0 |
|---|---|---|---|
| Chatham & Rochester | | Boulogne and Calais | |
| Cork | 9 0 | Barcelona | 23 0 0 |
| Dover | 7 0 | Bordeaux | 14 10 0 |
| Dublin | 10 0 | Cadiz | 14 10 0 |
| Exeter Quay | 10 6 | Copenhagen | 8 15 0 |
| Folkestone | 7 6 | Dieppe | 8 15 0 |
| London (Pool) | 5 9 | Genoa | 22 0 0 |
| Lowestoft & Yarmouth | 5 3 | Hamburg | 9 5 0 |
| Lynn | — | Havre | 9 15 0 |
| Portsmouth | 7 6 | Leghorn | 22 0 0 |
| Plymouth | 8 0 | Lisbon | 16 0 0 |
| Ramsgate | 7 9 | Rotterdam | 7 15 0 |
| Whitstable | — | Stettin | 9 5 0 |
| Weymouth | 6 0 | Trieste & Venice | £25 to 26 0 0 |

**TOTTENHAM & EDMONTON GAS-LIGHT and COKE COMPANY.**

NOTICE is hereby given that, in pursuance of the Act of Parliament incorporating the said Company, the ANNUAL GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the London Tavern, Bishopsgate Street, in the City of London, on WEDNESDAY, the 26th day of October instant, at Three o'clock in the afternoon precisely, for the purpose of electing Directors and an Auditor, in pursuance of the said Act, and for the transaction of general business.

(Signed) JAMES RANDALL, Secretary.

Edmonton, Oct. 13, 1859.

---

**EQUITABLE GASLIGHT COMPANY,**

21, JOHN STREET, ADELPHI.

NOTICE is hereby given, that a HALF-YEARLY ORDINARY MEETING of the SHAREHOLDERS of the said Company will be held at this Office, on TUESDAY, the 8th day of NOVEMBER next, to receive the Reports of the Directors and Auditors, and to declare a Dividend upon the Capital of the Company for the half year ending June 30 last.

The chair will be taken at One o'Clock precisely.

Notice is hereby also given, that the Transfer Books of the said Company will be closed on Monday the 31st instant, and re-opened on Tuesday, the 8th November next.

By order of the Board of Directors,

(Signed) SAMUEL ANDREWS, Secretary.

October 18, 1859.

---

TO GAS CONTRACTORS.

**THE Queenstown Commissioners** will receive TENDERS from parties willing to contract for LIGHTING ONE HUNDRED PUBLIC LAMPS with Gas of the best quality for THREE YEARS, from the 1st of JANUARY, 1860.

Particulars may be had on application to J. HAMMOND, Clerk Commrs., Commissioners' Office, No. 1, HARBOUR HILL.

Aug. 16, 1859.

---

TO GAS COMPANIES AND CONTRACTORS.

**FOR SALE, several lengths of Hy-** DRAULIC MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for Dip-Pipes.

Also, 4-inch ASCENSION-PIPES, 3-inch ARCH and DIP PIPES, and D MOUTHPIECES, all in excellent condition, and will be sold at a very low price.

To be seen on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

---

**WROUGHT-IRON Guides for Gas** HOLDERS, when Trussed upon scientific principles, are more capable of resisting strains, in every direction, than Cast Columns of any form can be; and weigh only one-fifth as much as the latter. Designs and Working Drawings for Guides and Ties can be obtained of the Inventor, CHARLES DIXON, C.E., Chichester, SUSSEX.

---

**EIGHTON MOOR GAS COALS.**— Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

---

TO GAS & WATER COMPANIES, ENGINEERS AND FITTERS.

**GARSIDE'S Registered Tube-Vice** holds all sizes of Wrought-Iron and Brass Tubes with the greatest firmness and least possible pressure; consequently it is not so liable to split or damage the Tubes as the ordinary Vice, and considerably facilitates the Workman, who may do almost double the quantity of work. Also,

GARSIDE'S IMPROVED MAIN-DRILLING CLIPS, for Drilling Holes for Service-Pipes. With this instrument the perforation of Pipes for the attachment of smaller Tubes can be effected with great ease and precision. Likewise,

HEAP'S REGISTERED GAS TONGS, most highly approved of as vastly superior to those in present use. Stocks, Taps, and Dies, together with all tools connected with Gas Engineering.

For Drawings, Testimonials, and prices, apply to the Maker, S. GARSIDE, Stamford St., ASHTON-UNDER-LYNE.

---

**WALTER MABON, Engineer,** ARDWICK IRON WORKS, FAIRFIELD STREET MANCHESTER,

Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

---

**J. CLIFF'S Fire Bricks, Clay** RETORTS, &c.

Orders for London and South of England to be addressed to Mr. NEWTON, Agent for the District, 16, Castle Terrace, New Hampstead Road, KENTISH TOWN, N.W.

N.B.—A few Retorts of each size, and a large stock of Bricks and Lumps, always on hand at the above Wharf.

---

THE ACT FOR REGULATING MEASURES USED IN SALES OF GAS.

**CROSLEY and CO.,** 103, SOUTHWARK BRIDGE ROAD, **LONDON,**

Are prepared to supply

**STANDARD CUBIC FOOT MEASURES**

of the capacity required by the 2nd Section of this Act, as well as

**TEST-METERS and GASHOLDERS,**

Accurately graduated thereby.

---

**THOMAS PHILLIPS,** 55, SKINNER STREET, SNOW HILL,

Patentee and Manufacturer of all kinds of Cooking Apparatus, Baths, Conservatory Boilers, &c., for Gas. Gas Stoves from 16s.; Cooking Apparatus from £1. Every article warranted.

N.B.—Public and Private Establishments fitted by Gas or Hot Water.

---

**CHARLES BOTTEN and SON, ENGINEERS & METER-MAKERS,** CRAWFORD PASSAGE, RAY STREET, CLERKENWELL, LONDON (E. C.).

Manufacturers of Station and Patent Protector Consumers' Meters, Patent Slide-Valves, Gas-Fittings, Pipes, &c.

Also, High-pressure Cocks, Hydrants, Closets, and all Water-Fittings.

---

**WILLIAM STEPHENSON & SONS, THROCKLEY, NEWCASTLE-ON-TYNE,**

MANUFACTURERS OF EVERY DESCRIPTION OF **FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,** *&c. &c.*

LONDON OFFICES:

76, KING WILLIAM STREET, CITY.

A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

---

**ROBERT MACLAREN and CO.,** EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

---

**M. SHEEN,** Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

---

TO GAS COMPANIES.

**BENJAMIN KITT,** GAS AND CONSULTING ENGINEER, UPPER BRISTOL ROAD, BATH.

Gas-Works taken on Lease, Gas-Works Erected, Plans and Specifications given for any Apparatus connected with Gas Making and Gas Distributing on the most modern improved scale.

---

**KINSON FIRE BRICKS are inde-** structible by heat, and are warranted to last twice as long as Stourbridge, Newcastle, or Welsh bricks. 80s. per 1000 at Nine Elms Station.

WORKS: POOLE, DORSET.

---

**ADDISON POTTER,** WILLINGTON QUAY, NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

---

**GEORGE ANDERSON,** Gas and CONSULTING ENGINEER, 104, LEADENHALL STREET, LONDON (E.C.).

**DIRECT-ACTING GAS-EXHAUSTERS,**

supplied either with or without Steam-Engines and Boilers.

**FOUR-WAY DIAPHRAGM VALVES,**

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

**RETORT SETTINGS,**

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

---

PATENT FLEXIBLE GAS TUBING, VULCANIZED INDIARUBBER HOSE-PIPES, WASHERS, PACKING, &c.

**JAMES LYNE HANCOCK begs to** announce a considerable REDUCTION in PRICE of his PATENT VULCANIZED INDIARUBBER TUBING.

VULCANIZED INDIARUBBER AIR-TIGHT BAGS, any size, for Gas Mains, with flexible tubes attached, and fitted with stop-cocks complete.

Manufactory and Warehouse, No. 6, Goswell Road, LONDON (E.C.).

---

GAS PURIFYING BY REVIVIFIABLE OXIDE OF MANGANESE.

**MR. LAMING (Inventor of the** Revivified Oxide of Iron Purification) begs to inform Gas Engineers that they may now supersede the material in general use by A REVIVIFIABLE OXIDE OF MANGANESE of his preparing, which in efficacy is at least equal, and in economy superior, to Oxide of Iron. Owing to the greater chemical activity of Manganese, common dry-lime purifiers of ordinary capacity will often be amply sufficient for it, though they may be too small for the Oxide of Iron material.

For Gas-Works possessing steam power, more especially such as are exposed to public complaint, Mr. Laming recommends the purification to be done either wholly or in part (depending on extent of apparatus) in out-of-doors scrubbers, hermetically sealed, by means of his liquid process, which is both economical, and meets all practical requirements.

118, Fenchurch Street, Aug. 1, 1859.

---

**WILLIAM RYDER, General** MINERAL AND METAL AGENT AND MERCHANT, 4, DEAN STREET, NEWCASTLE-ON-TYNE,

is prepared to supply Gas and Water Companies with Apparatus and Appliances of every description, including Cast and Wrought Iron Goods, Coals, Fire-Bricks, Retorts, &c. &c.

Any communications addressed to him as above shall have prompt attention.

---

**ALFRED PENNY, Engineer,** WENLOCK IRON WORKS, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY begs to inform Gas and Water Companies that he undertakes the erection of new, or the alteration of existing, works; and that he may be consulted generally on all matters connected with gas and water supply. He is also prepared to supply best Cold-blast Retorts, Socket-Pipes, and Connections, Iron Borings, &c. &c., and all the necessary Castings used in Gas and Water-Works.

*** Country orders executed with care and despatch.

---

**WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,** GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

---

**WEST and GREGSON, Gas-Meter** MANUFACTURERS, &c. UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

---

**CAST-IRON Retorts, Socket Pipes'** with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,

Old Barge Iron Wharf, Upper Ground Street, LONDON.

---

**PAROCHIAL ASSESSMENT OF GAS AND WATER WORKS.**

Just Published,

**A FULL Report of the Arguments** and the JUDGMENT of the COURT of QUEEN'S BENCH, delivered on February 25, 1859, in the case of the WEST MIDDLESEX WATER-WORKS COMPANY and the OVERSEERS of HAMPTON.

Price 1s.; by Post, 1s. 1d.

---

Also, uniform with the above, price 2s.,

**A REPORT of the Appeal of the Cam-** BRIDGE GASLIGHT COMPANY *versus* the GUARDIANS of the CAMBRIDGE UNION, heard at the BOROUGH SESSIONS on Saturday, January 8, and Friday, January 14, 1859.

W. B. KING, Office of the "JOURNAL OF GAS LIGHTING," &c., 11, Bolt Court, Fleet Street, LONDON, E.C.

**CANNEL and COAL** of the best descriptions for making GAS and COKE.
(As per Analyses.)
GAS CANNEL, 17s., 15s. 6d., and 14s. per ton.
GAS COAL, 11s. 6d., 9s. 6d., and 8s. 6d. per ton.
STEAM COAL, 10s., 9s. 6d., and 9s. per ton.
All free on board Vessels in Liverpool.
Handpicked Cannel and Coal about 10 per cent. additional. Concession in prices made for large quantities.
GAS APPARATUS of all descriptions, and on the most approved principles; also Purifying and other materials supplied.
ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references furnished on application.
CONTRACTS for Materials and Works entered into.
No charge made for Superintending Shipments, Preparing Bills of Lading, or passing Entries.

**EMANUEL TURNER and CO.,**
EXPORT OFFICES:
34, CASTLE STREET, LIVERPOOL.

**NO CHIMNEY WANTED FOR**
RICKETS'S PATENT CALORIFERE GAS STOVES,
IN CHURCHES, HALLS, OR SHOPS;
And for Conservatories, or any close apartment, a pipe can be attached to convey away the burnt air.
**RICKETS'S CHEAP GAS STOVE,**
**Price £1. 15s.,**
Made of sheet-iron, suitable for heating small Counting-houses, Bed-rooms, Cellars, &c. &c.

MANUFACTORY,
**AGAR STREET, STRAND, LONDON.**
*Liberal Discount to Gas Companies, Builders, and the Trade.*

# ALEXANDER WRIGHT,

GAS ENGINEER, MANUFACTURER OF GAS-METERS, GOVERNORS, AND EVERY DESCRIPTION OF GAS APPARATUS,
**55, MILLBANK STREET, WESTMINSTER.**
CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.
THOMPSON'S BROMINE TEST, £1. 1s.—BROMINE, 3s. per Ounce.
BISULPHURET OF CARBON TEST, £2. 2s.
APPARATUS FOR DETERMINING THE HEATING POWER OF SAMPLES OF COAL AND OTHER DESCRIPTIONS OF FUEL, £5. 5s.,
INVENTED BY LEWIS THOMPSON, ESQ., M.R.C.S.
REGISTERING PRESSURE GAUGE, Net Price, £8. Glass Shade, 10s. extra.
STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &C.

**LORD REDESDALE'S "SALE OF GAS BILL" having received the sanction of the Legislature, Gas Companies and Consumers are respectfully informed that ALL Meters made at this Establishment are constructed most carefully to meet the requirements of this Act.**

**WRIGHT'S COMPENSATING METER possesses peculiar claims on the attention of those who desire to obtain a most simple and thoroughly efficient instrument at a moderate price.**

# GRANT AND CO.'S
## PATENT COMPENSATING GAS-METER,

**Which secures accuracy of registration by its maintaining a true water-line under every circumstance, by a simple contrivance which is not liable to get out of repair; requiring little attention, they being self-acting—as the water is again used that is left, after supplying what has been lost by evaporation.**

**GAS-METER WORKS: EDINBURGH.**

# EDWARD COCKEY & SONS'
## PATENT GAS VALVES.

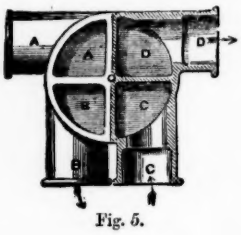


Fig. 5.

THESE Valves are formed of two cast-iron cylinders, with segmental divisions, having faces ground gas-tight, the upper cylinder turning horizontally on the lower one.

The lower cylinder has pipes from each division communicating with the vessels to and from which gas is to be passed. The upper cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one to alter the flow of gas from one vessel to another.

Fig. 6.

Fig. 5 represents the Valve arranged for a bye-pass, in which, by turning the upper cylinder, Fig. 6, the Gas is directed either through the bye-pass, or through the vessel to which it is attached.

Another arrangement is just completed for two purifiers, by which the Gas may be directed through both purifiers together, entering either first, or through either purifier separately. The advantages of this arrangement will be too manifest to Gas Manufacturers to need comment.

The Valves are manufactured by the Patentees at their

**IRON WORKS, FROME SELWOOD.**

The following Testimonial has been received from an eminent Engineer:—

*Gaslight and Coke Company's Office, Cheltenham, Jan. 17, 1859.*

Messrs. Cockey and Sons, Frome.

Gentlemen,—The Patent Purifier Centre Valve which I had fixed instead of the common hydraulic valve for one of our sets of purifiers with 9-inch connexions, I am happy to say continues to afford satisfaction both to myself and to the workmen who have the charge of it.

I am, Gentlemen, yours truly, W. ESSON.

## EDWARD COCKEY AND SONS
ALSO MANUFACTURE
PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,
HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

# WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.,

PATENTEES AND MANUFACTURERS OF

**GAS-METERS, GOVERNORS, AND OTHER APPARATUS;**

ALSO,

**METERS FOR MEASURING WATER, &c., &c.**

IMPROVED LOW-SPOUTED GAS-METERS,

Which completely meet the requirements of Lord Redesdale's Sale of Gas Act, and are as simple in their construction, satisfactory in working, and as low in price as the well-known Meters which have been made by W. P. and Co., and their predecessor, Mr. Samuel Crosley, during the last forty years, and of which there are about 300,000 now in use.

STATION-METERS AND GOVERNORS

*Of all Sizes, of the best Construction, Materials, and Workmanship, supplied on the shortest notice.*

There are about 300 Station-Meters at work of their manufacture, of sizes varying from 750 to 60,000 cubic feet per hour, of which the following are some of the principal ones, recently supplied by them to London Gas Companies, viz. :—

| | | | | |
|---|---|---|---|---|
| 2 | for | 60,000 | cubic feet per hour each | to the Chartered Gaslight and Coke Company, Westminster; |
| 1 | „ | 40,000 | „ „ | Chartered Gaslight and Coke Company, Brick Lane; |
| 2 | „ | 60,000 | „ „ | London Gaslight Company, Vauxhall; |
| 1 | „ | 60,000 | „ „ | Commercial Gas Company, Stepney; |
| 1 | „ | 40,000 | „ „ | Equitable Gas Company, Pimlico; |
| 1 | „ | 40,000 | „ „ | Phœnix Gaslight Company, Greenwich, |

*&c. &c. &c.*

And they have also supplied large Station-Meters to the Gas Companies at Birmingham, Nottingham, Sheffield, Southampton, Leeds, Newport, Glasgow, Manchester, Dublin, Cork, and all the principal towns in the United Kingdom, as well as many on the Continent, &c., &c.

Their Station Gas-Governors have been adopted by most of the above-named Companies, and have given universal satisfaction.

**PRESSURE REGISTERS, EXPERIMENTAL METERS, PHOTOMETERS,**

**Minute Clocks, Consumers' Gas-Governors, Pressure-Gauges,**

**STANDARD EXPERIMENTAL GASHOLDERS FOR PROVING METERS, &c.**

GEORGE LOWE'S PATENT NAPHTHA BOXES AND MOTIVE-POWER METERS,

WITH MACHINERY FOR WEIGHTS TO ASSIST THE SUPPLY OF GAS WHERE THE PRESSURE IS LOW.

**SPECIFIC GRAVITY APPARATUS, RAIN GAUGES, &c.**

---

**JAMES OAKES and CO.,**

ALFRETON IRON WORKS, DERBYSHIRE,

AND

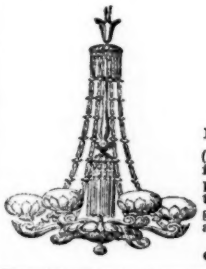
WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.



**F. & C. OSLER,**

45, OXFORD STREET, LONDON;

*Manufactory—Broad Street, Birmingham—Established* 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

BOULTON'S PATENT

**DRY GAS-METERS,**

Of which upwards of 24,000 are at present in use, having gained for themselves an unparalleled patronage from all the principal Gas Companies and Consumers, on account of their unerring registration and the superior workmanship and materials used in their construction, enables the Patentee to sell them now at competitive prices with those of other makers.

Every description of Improved Wet or Patent Dry Meters and Gas Apparatus manufactured by

**JOSEPH BOULTON**

28, BAGNIGGE WELLS ROAD, CLERKENWELL.

THE UNIVERSAL

**GAS-BURNERS REGULATOR,**

**(GEYELIN'S PATENT,)**

The only one in the world by which the flame from Argand, Fish-tail, and all other Burners remain invariable under all variations of pressure, and the cost of each light is less than one farthing per hour.

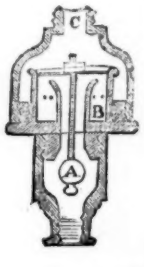
Can be fixed horizontal, close to, or distant from, the Burner; is ornamental, simple in construction, consisting of a double chamber, the inner perforated, covered with a diaphragm giving action to a spherical valve.

**PRICE 3s. EACH.**

*Can at all times be seen tested at the Manufacturer's,*

**JOSEPH BOULTON**

28, BAGNIGGE WELLS ROAD.



# ESSON'S PATENT
## COMPENSATING GAS-METER

**Is guaranteed correct within the meaning of the "Sale of Gas Act." Manufactured only by WILLIAM COWAN, Buccleuch Street Works, EDINBURGH; and St. Mary's Gate, MANCHESTER.—Established 1827.**

# JAMES MEACOCK,
## PATENT DRY AND WET GAS-METER MANUFACTURER,
## 7, SNOW HILL, AND 16, WEST STREET, LONDON.

**ESTABLISHED 1836.**

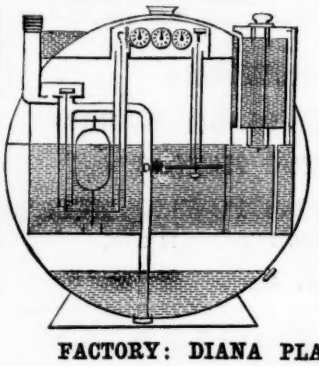
**JAMES MEACOCK** begs to thank Gas Companies and the Trade generally for the very liberal support awarded him in his Patent Dry Gas-Meter; his Improvement in connecting the Diaphragm between Metal Rings, cemented and screwed to the Tin Frames, being pronounced by Gas Engineers to be the most perfect improvement to the Dry Meter since its introduction.

J. M. invites attention to his Improvements in **EXPERIMENTAL WET GAS-METERS**, by which he renders impossible any Leakage from the Stuffing-Box.

**These METERS are GUARANTEED to meet all the REQUIREMENTS of the SALE OF GAS ACT.**

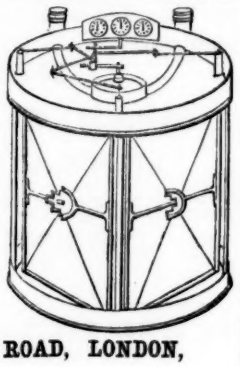
**GOVERNORS, STATION-METERS. PHOTOMETERS,**
EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,
AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

PATENT WET METER.



# N. DEFRIES,
CONSULTING GAS ENGINEER,
**Inventor and Patentee**
OF
## WET GAS-METERS,
WITH SELF-ADJUSTING WATER-LINE;
## DRY METERS,
GAS-HEATING BATHS, OVENS, STOVES,
**GAS FIRES with INDESTRUCTIBLE FUEL,**
*&c., &c.*

PATENT DRY METER.



**FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,**
**Eight Doors from Factory.**

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

## N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.

To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.

As to durability, his two large Meters at the Thames Tunnel have been in use night and day for upwards of twelve years—one continuation of dark hours—subjected to the wear and tear of seventy-five years as compared with the ordinary business hours of using Gas above ground.

## LORD REDESDALE'S SALE OF GAS BILL.

**All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.**

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

# FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

## JOSEPH CLIFF,

### WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

**M. B. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.**

---

**PADDON and FORD** respectfully invite the attention of Gas Companies and Managers to their PATENT STREET LAMP REGULATOR, which ensures any required consumption.

By its use a great saving is effected, and the item of "Unaccounted-for Gas" considerably decreased.

---

**PADDON and FORD, Patent** GAS-METER AND APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, LANTERNS, &c. &c.

Contractors for the erection or alteration of Gas-Works; and every description of Apparatus required in Gas-Works supplied.

---

**GEORGE CUTLER,** Gasholder MAKER,

No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

---

**WILLIAM CLIBRAN'S** Patent MERCURIAL GAS-GOVERNOR FOR STREET LAMPS.

W. C. begs respectfully to call the attention of Gas Companies to his PATENT GAS-GOVERNOR for STREET LAMPS, upwards of 3000 of which are now in use on Public Lamps. By their use any given quantity of Gas per hour may be consumed with the tap full open whatever the increase of pressure may be, thus preventing a great waste of Gas in many of the Lamps, and securing to the public an uniform light. Prices, 3s. 4d., 3s. 6d., and 3s. 8d. each.

Governors kept in stock from three-eighths of an inch to four inches bore.

Samples and Testimonials forwarded on application to WILLIAM CLIBRAN, 43, Todd Street, MANCHESTER

---

**BENJAMIN GIBBONS, Jun.,** DEEPDALE FIRE-CLAY & BRICK WORKS,

**Near DUDLEY,**

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

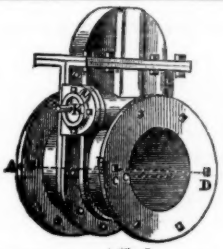
**FIRE-CLAY RETORTS,**

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

---



**BRYAN DONKIN & CO.**

keep always on stock their

**IMPROVED GAS VALVES**

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works.

**BRYAN DONKIN & CO.,**

*ENGINEERS,*

NEAR GRANGE ROAD, BERMONDSEY.

---

**BIRTLEY IRON WORKS,** CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

---

**HARRIS and PEARSON** PROPRIETORS OF

BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.

MANUFACTURERS OF

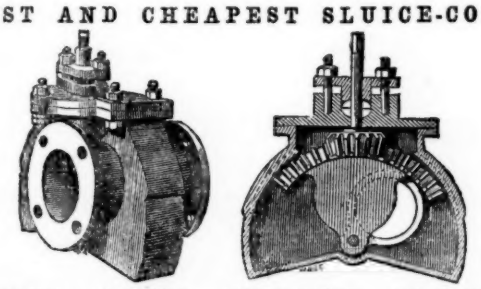
**FIRE BRICKS GAS RETORTS &C.**

AMBLECOTE FIRE CLAY AND BRICK WORKS, STOURBRIDGE.

*Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.*

---

BEST AND CHEAPEST SLUICE-COCK.



## BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

**Can be taken to pieces without being removed from the line of Piping.**

**NORTH WILTS FOUNDRY, DEVIZES.**

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

---

# WILLIAM INGHAM AND SONS,

## WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

**RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,**

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

**Estimates for Setting, or Bricklayers sent when required.**

**GAS OVENS IN SEGMENTS OF EQUAL QUALITY.**

**London Agents: CHADWICK and AKEROYD, Willington Stone Wharf, Regent's Park Basin.**

**A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.**

N.B.—*Export orders continue to have prompt attention.*

## LORD REDESDALE'S SALE OF GAS ACT.

## WILLIAM SUGG

Begs to inform Gas Companies and his Customers generally that henceforth all Meters sent out from his Works, both Water and Dry, will meet the requirements of the above Act.

To those Gas Companies who desire a Self-Adjusting Meter, he recommends his "COMPENSATING WATER METER" as a simple and efficient instrument, combining accuracy of registration with protection against fraud, while the slight difference in form between it and the ordinary Water Meter renders the alteration of existing stock a matter of comparative ease and moderate expense.

Those who approve of the non-compensating Meters will find his "WATER-BOX METER" all that can be desired.

**GAS-METER and APPARATUS WORKS: 19 and 20, MARSHAM STREET, WESTMINSTER.**

## SALE OF GAS ACT.

## MESSRS. CROLL, RAIT, AND CO.,

**Manufacturers of Croll's Patent Improved**

## DRY GAS-METER,

being informed that several Gas Companies are under the impression that Dry Meters will not be allowed by the above Act, beg to say that such is not the case, inasmuch as the Act embraces "every kind of machine used for measuring gas," and provides for the testing of the same, in its 13th clause.

Speaking for themselves, and of the Meters manufactured by them, C., R., and Co. have the gratification of knowing that not one single Meter out of the large number they have sold, will, when tested by an Inspector, be rejected; and, consequently, that neither Gas Companies nor Consumers who have these Meters in use will be put to one farthing expense for alterations.

C., R., and Co. always adopted the unit of measure provided for by the 2nd clause of the Act, and have never allowed themselves a greater latitude than 1 per cent. either fast or slow, and they intend to adhere to these limits, notwithstanding that the Act allows 2 per cent. fast and 3 per cent. slow.

C., R., and Co.'s Meters register most correctly all the gas passed through them, whether it be the smallest quantity or the full complement for which the Meters are made; and *they are prepared to give written guarantees to Purchasers that the Meters shall, when tested by an Inspector on his appointment under the Act, be approved of by him as correct. In the event of such not being the case, the Purchaser to be entitled to return the Meters to C., R., and Co., and claim from them their cost, together with any expenses incurred by their rejection.*

Further, C., R., and Co. undertake, during a period of five years from the date of purchase, to put into good order, free of charge to the Purchaser, any Meters of their manufacture which may become defective.

## CROLL, RAIT, AND CO.,

DRY GAS-METER MANUFACTURERS,

**CANAL BRIDGE, KINGSLAND ROAD, N.E.,**

are prepared to supply

**STANDARD CUBIC FOOT MEASURES,**

of the Capacity required by the 2nd Clause of the Act,

**as well as Gasholders correctly graduated thereby.**

**STATION-METERS, GOVERNORS, PRESSURE-REGISTERS, AND OTHER GAS APPARATUS SUPPLIED.**

*Particulars given upon application.*

## D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

**PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,**

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

**GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;**

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

**IMPROVED FULL-WAY CARTER'S VALVES (much approved of);**

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

**D. HULETT'S IMPROVED SERVICE CLEANSER**

for clearing out Mains, Services, and Interior Fittings—60s. net.

*Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.*

**Sole Manufacturers of Church and Mann's Photometer.**

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.


London: Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court Fleet Street, in the City of London.—Tuesday October 25, 1859.